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The THERAPEUTIC GAZETTE

INCORPORATING

MEDICINE AND THE MEDICAL AGE

A Monthly Journal of Practical Therapeutics

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MEDICINE AND THE MEDICAL AGE

Whole Series. Vol. XLIII. | DETROIT, MICH., APRIL 15, 1919. | Third Series. Vol. XXXV, No. 4.

ORIGINAL COMMUNICATIONS.

THE TREATMENT OF UTERINE HEMORRHAGES FROM THE MODERN VIEW-POINT.[1]

BY HOWARD A. KELLY, M.D.,

Professor of Gynecology in Johns Hopkins University, Baltimore.

It seems a fitting time to present to the profession at large some account of our new and greatly changed view-point in the matter of the treatment of uterine hemorrhages of certain types.

While any escape of blood from the body in an unaltered form in one sense constitutes a hemorrhage, we cannot apply this broad definition to uterine hemorrhages, for here a regular monthly discharge is the norm for some thirty years of life. The question of hemorrhage in the case of the uterus limits itself to the amount above normal and to the effect it produces on the individual.

An excessive flow, long kept up, calling for frequent changes of the napkins, and weakening the patient, are the common characteristics of a uterine hemorrhage, a diagnosis easier to make in the individual case than to define broadly on paper.

At the menarche (beginning of menstruation), and at the menopause (ending of menstruation), irregularities in amount and time are common, without being pathological. The common knowledge of this fact has cost many a woman her life, as she has not been aware of the fact that toward the end these much-heralded irregularities are also the surest sign of serious diseases which, advancing unchecked, may destroy life. The difficulty lies in the patient's lack of previous experience, in her not knowing how much irregularity to allow for, a fault easily corrected by the skilled doctor's larger experience.

I want especially to say a few words to those readers of the GAZETTE who are engaged in general practice, as it is on this common ground of uterine hemorrhage that we meet daily, and any information ought

A.—Type of the feathery abundant endometrium often erroneously called "endometritis," found in young women who bleed excessively at menstruation. "Endometritis" is almost always an utterly erroneous diagnosis.

to be made common property as speedily as possible. Let me lay down a few rules which guide me in my work, somewhat after the fashion of what used to be called aphorisms.

[1] The simple sketches are similar to those made at the bedside on the patient's history sheet.

In the first place every menstruating woman with few exceptions demands some attention and care; there ought to be a little more relaxation and rest from cares and occupation, for a day or two after the onset. The inability to do this is a part of the great pity of so many young girls going into the industrial field for a livelihood. At the beginning (the onset of menstruation) a young girl ought to be watched with unusual solicitude, and instructed how to safeguard herself at this time, especially in avoiding exposure, catching cold, and overfatigue and constipation. If the function is seriously upset at the start it is apt to continue on that type as a habit, and it will be hard to set it right later.

For unusual pain and undue flow there is no treatment comparable to putting the patient to bed for a couple of days each month, for a time.

Let me make a declaration right here which I know will be disputed by many a capable practitioner, namely, that I know of no drug which has the power of checking or stopping the menstrual flow. Still less do I believe that ergot or ergotole is of any more use than so much brick-dust, and yet we have given literally tons of ergot for this purpose! If my statement is correct, what therapeutic follies we have committed!

At the menopause end of life every unusual flow demands careful study and a diagnosis, with the thought always in mind that this particular patient may have a cancer, until the contrary is clearly proven.

In contrast with all the other organs of the body the uterus might be called the normally periodic bleeding organ; an excess of its bleeding function is noted under these several circumstances:

There is the excessive flow in young girls when menstruation starts; excessive flow in married women in the child-bearing period of life; excessive flow in the unmarried, say from thirty-five to forty; excessive flow in the married from thirty-five to forty and upwards.

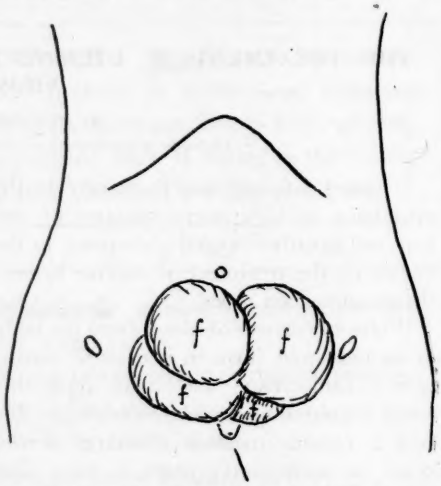
Each of these age and social divisions has its own peculiar liabilities to certain forms of hemorrhages, some harmless and others most serious.

The commoner causes of hemorrhages which ought to be borne in mind are the following:

1. The simple free flow in the young girl without demonstrable cause, an inexplicable irregularity of the onset.

2. Miscarriage in the married.

3. Extrauterine pregnancy, associated with cessation of menstruation and irregularity, and pains—not always, however,



B.—Conglomerate multinodular fibroid tumors (*f*) of the uterus filling lower abdomen associated with hemorrhage, caused by tumors not seen, in the uterine wall.

with all these marks, and sometimes with none of them.

4. A fibroid tumor or a polyp (rarer), about middle or more advanced life.

5. Cancer of the body of the womb, say from thirty-five up.

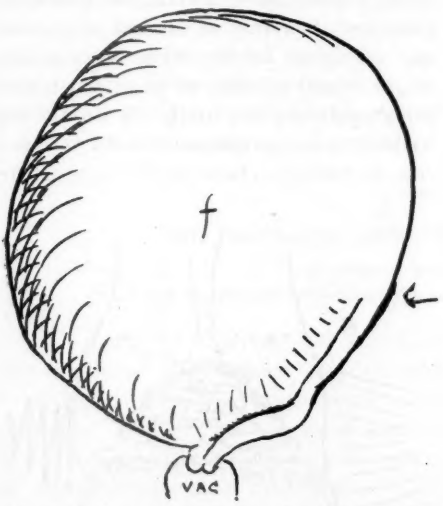
6. Cancer of the neck of the womb in the child-bearing woman.

7. Ovarian tumors on one or both sides of the womb sometimes cause hemorrhages; these can usually be felt as considerable masses choking the pelvis.

8. Lastly, we must not forget that serious cardiovascular disturbances or blood diseases may cause uterine hemorrhages.

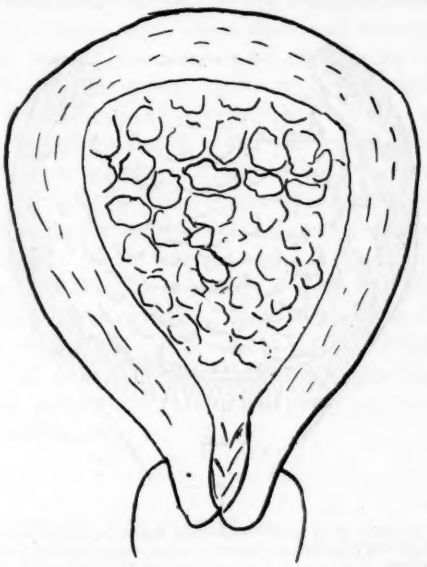
The diagnosis of the cause of the hemorrhage is as a rule extremely simple, and ought never to be neglected. The physician who only sits at the bedside of his patient and feels her pulse and prescribes a potion seriously neglects her interests and his own highest obligation.

Let me put the matter very broadly, in the case of a young girl, a virgin: here alone is it justifiable to put the patient to bed without an examination. The salutary maxim has come down to us from antiquity: *Magnum est crimen perrumpere virginis hymen.* This is not a counsel of inactivity when after due patience the flow continues persistent and threatening, for the safety of the patient is the supreme law. A rectal examination can be made in the virgin to see if the uterus is in place and of normal size, and then if needs be an anesthetic, preferably gas, can be given and the uterus curetted. By repeated curettages, under gas, carried out every month as soon as the flow was beyond normal, I have saved several young women from mutilating operations. I have even done this operation ten, fifteen or more times in one patient. One of my young women who had been told that the next hemorrhage meant the removal of all her organs is now the mother of numerous children.



C.—Single large spherical fibroid tumor filling lower abdomen, and rising above umbilicus. Arrow points to the fundus and the greatly elongated uterine cavity reaching point indicated. A hump can often be felt through the abdominal wall indicating the fundus of the uterus. The liability to hemorrhage is greater when the uterine cavity is spread out and in extensive relation to the tumor.

To revert to the more general discussion, and forgetting this class, the diagnosis may be as simple as resting the hand on the abdomen and discovering a large fibroid tumor there, or it may await the introduction of the finger into the vagina, where the cervix is found bleeding and friable—a cervical cancer. Let me advise the use of a thin rubber glove for this examination in justice to the next clean patient to be examined. If no fibroid is felt above and no cancer is touched below, then use both hands, one in the vagina and one above feeling through the lower abdomen, and acting together bimanually. If the uterus is somewhat enlarged and bossed, it is quite surely a fibroid uterus of lesser size. If it is uniformly enlarged it may be either a cancer of the body, or more likely a simple hypertrophy, the so-called myopathic hemorrhagic uterus, a well-recognized, common enough disease, but little understood.

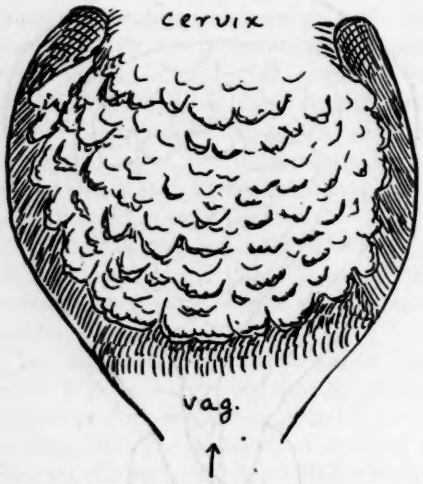


D.—The greatly enlarged uterus with bossed nodular excrescences in a cancer of the body. In a few instances the cancer has been found limited to a small area which has been entirely relieved by the curette. This type is always best treated by radical operation.

Masses at the sides, or a pelvis filled with conglomerate masses, will at once suggest disease of the ovaries and uterine tubes. In examining do not forget the rectal touch, as it serves to clear up conditions higher up.

One step more remains to be taken to make the diagnosis sure, and to make certain that there are not two causes at work to produce the trouble, and that is the dila-

tation and curettage of the uterus, removing some of the cervix or endometrium, always for a careful competent microscopic diagnosis. Many men fail just here, as they are not prepared to harden tissues and cut sections themselves, and they do not know just what to do with the specimens they have secured. Let me say that my own clinic,



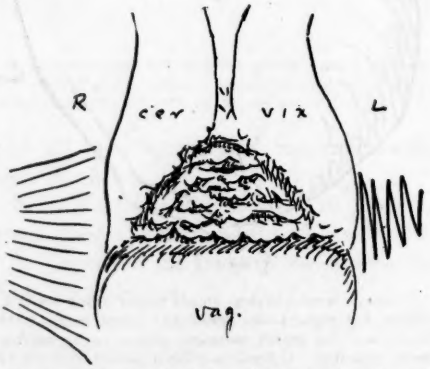
E.—Type of extensive cauliflower cancer of cervix, often surprisingly limited to the cervix alone, easily handled with radium.

and I am sure any other reputable clinic, will gladly make such an examination and report, and if the patient is poor, and the request is made, without charge. However, it is essential to put the tissues immediately on removal into a ten-per-cent formalin solution and to mail, accompanied by accurate brief notes about the case.

With our careful history, digital and bimanual investigation we have found the source of the hemorrhage. What are we to do next?

If the disease is not malignant, and the patient's condition is in no way alarming, we can afford to wait and watch for a time. In a fibroid tumor the simple act of curetting often gives prolonged relief; also if nothing is found more than an abundant endometrium, a curettage is often enough.

In the severer hemorrhages nearing, or at the time of, the menopause, the question of stopping the flow altogether at once comes up. This can be done by removing the uterus, whether it is a fibroid uterus or simply a hypertrophied bleeding uterus. There is no operation which has been a greater boon to suffering women than this radical procedure in those who are nearing the menopause with intractable hemorrhages. However, within recent years a new source of relief has been found in radium, which does away with the mutilation and the dangers of a hysterectomy. The field of radium in this group of cases we have been considering is large and beneficent. We are able with radium to stop the menstrual function at will, or in some cases in younger women to regulate it. In the myopathic hemorrhagic uteri, where all we can discover is that the uterus is enlarged, a single insertion of several hundred milligrammes of radium on the end of a sound into the uterus for several hours is enough to put an end to losses of blood which have threatened even life itself. If we are still wedded to an operation it would yet, as a rule, be better to check the flow and let the



F.—A craterous malignant cervix due to ulceration and breaking down of the diseased tissues associated with hemorrhage and foul discharges. The wavy lines to the left of the uterus I often use to show that there is an infiltration there pulling the cervix to the left pelvic wall. The lines on the right side indicate rather a wider denser pyramidal infiltration extending from the cervix and vagina out to the right wall of the pelvis. Both these forms of infiltration are best felt through the rectum.

patient pick up and make up some of her lost hemoglobin, by using radium before subjecting her to the surgical ordeal.

In fibroid uteri we get surprising results with radium as a rule, in that not only does the flow stop with the menstruation, but the tumor also begins to shrink, and in time

often disappears entirely! I place radium, and not operation, first on my list in the treatment of fibroid tumors. Indeed, in many of the cases I see nowadays no other treatment is possible, for they have some severe dyscrasia, and are suffering either with diabetes, or heart disease, or tuberculosis, or other trouble, utterly forbidding operation. Some of the most brilliant results have been in the extremely anemic group. Cancer of the body of the uterus ought always to be operated on, and not radiated.

Cancer of the cervix, however, responds most favorably to radium, and can almost always be wiped out by a big thorough application. Let me state my rule here. An easily operable case of cervical cancer is curable by radium, but I find no fault with the surgeon here, as surgery, too, gives good results, albeit with greater pain and risk. Now in every other case of cancer of the cervix than in this early easy group, radium is far better and far safer than operation, for if the disease is advanced enough to limit the mobility of the cervix a little or more on one side, the patient stands a better chance of getting rid of it and getting well permanently with radium than with an operation.

In the still more advanced cases radium is absolutely the only hope, and here there is a definite hope, where there was none at all before; if we do not get many cures in this hopeless group, we do get a prolonged period of marked improvement.

In conclusion, then, let me summarize. Radium has come as a great boon for the very class, the hemorrhagic cases, which we have under consideration; leaving out the cancers of the uterine body, it saves the patient from an operation in almost all the other cases, namely, fibroid tumors, bleeding uteri, and cancers of the cervix. There is no part of the body where the blessings of radium are more signal than in these bleeding uteri.

THE DIAGNOSIS AND TREATMENT OF ABORTION.

BY JOHN M. FISHER, M.D., F.A.C.S.,
Associate Professor of Gynecology in the Jefferson Medical College, Philadelphia.

The etiology of abortions, the diagnosis and treatment of associated constitutional conditions and of exceptional pelvic complications, will not be considered in this paper, but it will be limited to a discussion of the diagnosis and treatment of the common run of abortions ordinarily met with in practice.

Clinically the most important subdivision of the subject is that of clean and infected abortions, and while both conditions will engage our attention, a discussion of the former is the more essential from a prophylactic standpoint for the reason that most of the seriously septic have become so through ill-advised manipulations of clean cases.

With comparatively few exceptions, threatening and inevitable, complete as well as incomplete abortions originally are clean (uninfected) cases, and this type, therefore, is entitled to first consideration.

UNINFECTED (CLEAN) ABORTIONS.

Threatening Abortion. — A pregnant woman may have intermittent uterine contractions, pain, hemorrhage, dilatation of the cervix, and bulging deciduous membranes, and yet these manifestations of a threatening abortion may subside and the gestation continue.

In a recent pregnancy of two and a half months all of the phenomena enumerated were present — the membranes bulging through a cervix dilated to the extent of at least a half-inch, while the attendant with a view to hasten a supposed inevitable process had given the patient pituitrin hypodermically and three half-drachm doses of ergot within twenty-four hours—but in spite of these uterine insults the ovum remained intact, and under the influence of rest in bed, an ice-bag over the hypogastrium, and several hypodermics of mor-

phine, the symptoms gradually abated, the cervix closed, and the gestation was preserved.

After giving the initial hypodermic of morphine the following suppository administered every four or five hours according to circumstances often fulfils the indications equally satisfactorily:

℞ Extract. opii, gr. 1;
Extract. hyoscyami, gr. ss;
Olei theobrom., q. s.

The common practice of tamponing the vagina in a case of threatening abortion is fraught with the danger of exciting reflex uterine contractions and thus converting it into an inevitable condition.

In all cases of threatening abortion the patient should remain in bed for at least a week after the disappearance of the symptoms.

In some instances notwithstanding appropriate treatment and the abatement of all other symptoms more or less of a hemorrhagic discharge may persist for several weeks, and finally terminate in a spontaneous expulsion of the ovum.

Inevitable Abortion.—An abortion becomes inevitable as a result of, first, death of the embryo; second, detachment of a large portion of the ovum; and third, rupture of the ovum.

The difficulties attending the diagnosis of the first two conditions during the earlier weeks of pregnancy, save in exceptional instances, are such that clinically a threatening abortion cannot be regarded as having become inevitable until after the membranes have ruptured. While the ovum remains intact, therefore, the conscientious practitioner may, as a rule, continue in his efforts to save it from destruction.

Having determined that an abortion is inevitable, nature's efforts to successfully complete the process with safety to the patient should be respected. If she is under the care of a family practitioner and is in good general condition, if she has regularly recurring uterine contractions with moderate bleeding, and if the doctor can, should he be required, be summoned on short notice, a plan of watchful waiting may be adopted with a reasonable assurance that in time the uterine contents will be discharged spontaneously.

If, on the other hand, the family attendant has not sufficient control of his time to respond to such a call promptly, if the patient's general condition is such that even moderate bleeding might prove seriously detrimental, or if under any circumstances the hemorrhage becomes alarmingly excessive, tamponing the vagina under the strictest antiseptic precautions should be resorted to.

A tampon properly introduced not only arrests the hemorrhage but the increased uterine contractions provoked by its presence favor the final detachment and expulsion of the ovum. If the removal of the tampon in four to twelve hours is not followed by the discharge of the ovum, or fails to yield to external compression of the uterine fundus, the packing may be repeated to await results at a later period.

While all forms of intrauterine manipulation by the family attendant in the treatment of inevitable abortion are attended with the risk of carrying infection, such interference should, as a rule, be avoided. In some cases of fetal abortion (after the twelfth week), however, localized interference may become imperative. The process at this stage simulates a premature labor with a tendency to terminate spontaneously, but delay and severe hemorrhage may be occasioned by an early rupture of the membranes or by the head failing to become engaged in a partially dilated cervix. The labor in such cases usually is facilitated and the hemorrhage controlled by turning the head to one side and bringing down a foot, followed by continuous traction on the delivered member until the body engages the cervical opening.

In all cases of inevitable abortion after the uterus has expelled its contents nothing by way of local treatment should be attempted, unless there is excessive hemorrhage, the management of which will be referred to presently.

Complete Abortion.—Considering the character of the discharge subsequently it

is questionable whether an abortion in any case is complete in the sense of leaving the uterine cavity free of chorionic and placental tufts or shreds of membrane. In the early weeks of pregnancy the decidua vera rarely is discharged with the ovum, but usually is cast off in the form of disintegrated débris. An arrest of drainage by an obstructing clot may result in localized changes and cause toxic symptoms not unlike those met with in some cases of so-called incomplete abortions, but the normal generally is promptly reëstablished following the expulsion of the offending material by spontaneous uterine action or by external compression of the fundus. Either of these failing the gentle introduction of the gloved finger through the partially contracted cervical canal may displace the obstruction and secure the desired result. Patience and common sense in the exercise of professional judgment are essentials in determining the advisability of localized interference. There is more danger in resorting to such a procedure too early than too late.

Incomplete abortion as generally understood consists of the retention of portions of the ovular envelope or of placental structure in mass adherent or detached. Such retained material with but few exceptions will be discharged spontaneously if given sufficient time. The seriousness of its undue retention and consequent morbific influence, as will be pointed out later, have been somewhat overdrawn by a certain contingent of the profession. Localized interference in these cases is attended with more risk of blood infection than would be incurred by favoring nature's processes with patient waiting.

There is one condition, however, that supersedes all other considerations at any stage of an abortion, even at the risk of causing superadded complications subsequently, and that is profuse hemorrhage as evidenced by an excessive continuous flow, the discharge of large clots, and a failing circulation. The danger is immediate and must be met promptly.

How to proceed in the treatment of excessive uterine hemorrhage necessarily must be based on the patient's environment, and involves a personal equation in experience and skill on the part of the professional attendant. What an advanced specialist may do with benefit to the patient in a well-appointed hospital and what the family physician can do with safety are two entirely different things. On the part of the average doctor a properly introduced vaginal tampon fulfils the indication and is attended with the least risk to the patient. All intrauterine manipulations should be avoided. Very rarely is the hemorrhage of such an alarming character that the cervix as well as the vagina require packing. Coincident with the vaginal tamponade pituitrin or ergot should be administered to stimulate uterine activity. The removal of the tampon in from twelve to twenty-four hours usually is followed by the expulsion of the retained material. Exceptionally repacking of the vagina may become necessary to secure the desired result.

In cases in which a protruding ovular mass presents itself through a well-dilated cervix, external compression of the uterine fundus may effect its expulsion, or its withdrawal may be accomplished by the use of a wide-bladed placenta forceps. Neither finger nor forceps during such manipulations should be introduced into the uterine cavity. Failure to thus completely empty the uterus would still leave such a case in the class of incomplete abortions to be dealt with as already indicated.

Intrauterine irrigation after an abortion is mentioned merely to condemn it, and the value of vaginal douching is questionable.

Notwithstanding the management of the exceptional conditions referred to, the fact cannot be too strongly emphasized that a policy of judicious watchfulness and not a precipitate resort to local measures is the higher professional virtue in the treatment of the vast majority of uninfected abortions.

In cases requiring localized attention nothing exceeds in importance the observance of the strictest aseptic and antiseptic precautions on the part of the family attendant.

It is generally admitted that most of the

cases of septic contamination are traceable to examinations made without sterile rubber gloves and through unprepared vulvovaginal orifices.

Polak in his hospital service found that cases of abortion tamponed before admission almost invariably were infected. Many of these, no doubt, were free from symptoms, but in accordance with laboratory findings they carried all the potentialities of grave manifestations upon further ill-advised manipulations.

Every successive stage of an abortion increases the susceptibility to infection, and no valid excuse can be offered by the practitioner for failing to safeguard his patient against it.

The fact that nine patients escaped contamination at the hands of a careless attendant is no argument against the possibility of the tenth becoming a victim of an infection. Good sterilizing apparatus can be bought cheaply, and a properly equipped outfit in gowns, pelvic drapery, gauze, rubber gloves, etc., with most busy practitioners is more a question of detailed attention than of expense. No doctor practicing obstetrics has the moral right to be without proper paraphernalia for doing clean work.

The observations of Dr. George A. Ulrich on the behavior of menstruation after an abortion are well taken: "If the first menstrual flow is more prolonged or more profuse than formerly it goes unheeded, but if the succeeding period presents like characteristics, and especially if it is more pronounced than previously, it is indicative of some abnormality that should be sought for and corrected."

Occasionally a patient complains of more or less bloody soiling, or experiences irregular attacks of free bleeding extending over a period of two or more weeks after an abortion. If the menstrual disturbance mentioned or either of the latter manifestations are unaccounted for by some constitutional disturbance, or by some other localized disorder, the cause of the symptomatic abnormality usually is referable to a post-abortive endometritis, uterine subinvolution, or the presence of a so-called placental polyp (a portion of the ovular structure still adherent to and vitalized by the uterine wall). Two and not infrequently all of these pathologic entities coexist. The uterus at this stage, as compared with its condition at the time of delivery, is considerably reduced in size, the previously patulous venous and lymphatic sinuses have become obliterated, the musculature is firmer, the round-cell infiltration beneath areas of irritation is more pronounced, with a resulting localized, as well as a more generalized, immunity to infection.

Contrary to the ultra-conservative practice advocated in cases immediately following a complete or an incomplete abortion, the indications in the presence of these later manifestations are the adoption of measures directed toward the prompt removal of the focus of irritation and the rëestablishment of normal conditions. Dilatation and curettement of the uterine cavity followed by gauze packing usually fulfils the ends in view. The packing prevents excessive hemorrhage, serves the purposes of a drain, and finally its presence as a foreign body excites the arrested functional activity of the uterine musculature in reëstablishing the properties of contraction and retraction with a resulting equalization of its circulation. A properly introduced drain usually has served its purpose in from one to two days. Upon its removal the uterus is generally found to have undergone a material reduction in size, while the retrogressive change thus inaugurated continues to the final completion of involution.

INFECTED ABORTIONS.

The surgical radicalism in the treatment of infected abortions advocated by some and the inactive conservatism taught by others are not alone diametrically opposed in principle, but the practice of the one, it is usually charged by its opponents, may become responsible for deleterious influences which their own methods of treatment aim to avoid.

Not unlike others of the profession the writer has been tossed about on a sea of

conflicting opinions, bolstered by pages of equally conflicting statistics, the outcome of divergent views of great clinicians relating to this question on the one hand, and has well-nigh been "scared out of his wits" by some of the bogies that have come from the laboratory on the other. By following for a time the dictum of the one, and then the other, with variable results, he has, to say the least, secured an invaluable experience together with a certain sense of discrimination on the clinical value of laboratory reports and the reliability and practical usefulness of much that has been written on this interesting topic.

To properly comprehend the significance of an infected abortion and at the same time acquire a reasonably rational view concerning its treatment, certain well-established and trustworthy observations on the bacteriology and its localized pathology should be constantly borne in mind.

It is a matter of common knowledge that the severity of a uterine infection in different individuals by the same microörganism even varies in type from the most malignant, resulting in a fatal termination in a few hours, to a type with symptoms so mild that in the absence of extraordinary precautions it may escape detection. These clinical variations usually are accounted for by one or more of the following conditions: (*a*) the biochemical or bactericidal properties of the involved localized structures; (*b*) constitutional resistance natural or acquired; or (*c*) the ever-present doubtful character and behavior of the contained microörganisms.

In this connection it is of interest to note that bacteriologists still acknowledge their inabilty to differentiate the manifest biologic peculiarities and the ever-changing characteristics of septic microörganisms from innocuousness to tendencies of malignancy by any known laboratory methods. Neither the pronounced differences in the vitality and disease-producing qualities of a given variety of bacteria within the uterine cavity nor the clinical manifestations of a septic abortion are the product of laboratory investigations, but both are based upon the same speculative and ofttimes contradictory observations made by the practicing physican at the bedside: in other words, there is no recognized relation between the infecting microörganism and the variability of the symptoms. While the detection, therefore, of the special form of invading bacteria may be of interest to the man of the laboratory, it has no prognostic value with the clinician, and its supposed usefulness in the adaptation of specific forms of treatment with specially prepared synchronized sera and vaccines has been well-nigh abandoned.

The tendency in almost all of these cases is for the process to remain localized, the coincident reactionary symptoms depending upon the absorption of toxins the result of endometrial necrosis and consequent intrauterine putrefaction.

The more wide-spread infections and true bacterial blood contaminations primarily usually occur in abortions induced with unclean instruments and by the practice of bunglesome manipulations, and yet, considering the appalling frequency of criminal abortions among all classes of society, the comparative infrequency of blood contaminations, and the still rarer fatalities, it behooves us to heed with profound respect nature's processes in her efforts to conserve the health and life of the individual in all cases of septic abortion lest in our eagerness to relieve the patient of present symptoms we resort to measures that may become responsible for superadded complications and not infrequently death of the patient.

Generally speaking a patient who within twenty-four hours after an abortion has repeated chills, more or less persistent high temperature, and a uterus free from retained material usually gives the thoughtful practitioner vastly more concern than the same constitutional reaction occurring three or four days later in a patient with a foul discharge. In the one he recognizes that the uterus merely plays the part of a carrier of pathogenic bacteria to the circulating medium unopposed by their environment in transit, while in the latter case there exists a definitely defined, dem-

onstrable, pathologic process confined to the cavity of the organ and the endometrial structures, harboring, it must be admitted, colonies of bacteria of unknown virulence, but which are here domiciled by a protective cellular barrier or uterine reactionary zone, and in many cases the localization of the process is so distinctly defined that the putrid discharge is the only symptom that attracts attention.

In accordance with the well-known observations of Bumm this zone of reaction lying beneath the necrotic endometrium occurs in response to the localized irritation, and consists of a spongy cellular formation in which comparatively few of the infecting microörganisms are found, while the healthy myometrium beneath it usually is free from them.

In addition to its bactericidal properties during the more active stage of the pathologic process, this leucocytic envelope likewise promotes the gradual separation of the retained saprophytic and infected material and subsequent to its expulsion continues a potent factor in the final destruction and elimination of any remaining microörganisms.

The relief from febrile reaction and other symptoms following the spontaneous discharge of the uterine contents so generally observed merely confirms the presence of a localized isolating medium as well as the toxic, or saprophytic, origin of the symptoms.

These fundamental studies in the bacteriology and pathology of septic abortions, repeatedly verified by laboratory investigations and supported by unquestionable clinical evidence, are so well established that they should not go unheeded.

It is now generally conceded that intrauterine treatment is contraindicated in all cases in which the uterus without itself becoming structurally involved merely has played the part of an intermediary or a carrier of pathogenic bacteria in the causation of a generalized blood infection. But certain members of the profession still hold to the practice of active surgical measures whenever the uterus remains the focus of the infection as indicated by an offensive discharge.

That the removal of necrotic uterine contents by manual or instrumental means is followed by a prompt relief from existing symptoms in a large proportion of cases is a matter of common observation, but it is likewise true that not infrequently such treatment is succeeded by chills, increased febrile reaction, and other symptoms indicative of a more wide-spread pelvic infection or the graver complication of a generalized blood contamination.

But the abatement of acute symptoms in the former group of cases following a curettement, for example, by no means gives assurance that the patients are cured in the sense of escaping subsequent morbidity, nor does it prove that these same subjects ultimately would not have made more satisfactory recoveries had they been treated expectantly.

Statistical reports on the part of those who advocate localized interference and at the same time claim to have followed the expectant plan for the sake of comparison are notoriously unfair, in that the very grave cases and those in a dying condition invariably are treated expectantly, thus giving an undeserved mortality to the conservative plan, while cases of serious blood infections of their own creation and the morbidity among their so-called cures following curettements are either overlooked or camouflaged with specious explanations.

No one in this country has followed the subject of the radical and conservative treatment of septic abortions with especial reference to remote results with more scientific zeal, and none has exhibited a more conscientious spirit for getting at the truth and presenting it with absolute fairness, than Dr. Polak of New York. In reviewing his experiences in a paper on this subject he states: "The routine culture of the interior of the uterus has been illuminating in the fact that more than 60 per cent have shown a pure culture of either the staphylococcus or streptococcus when such culture has been made from forty-eight hours to four days after the supposed miscarriage.

The finding explains why a large number of incomplete abortions which were formerly subjected to routine curettage have subsequently developed parametric exudates, yet it must be admitted that several women from whose uterus a positive culture of the streptococcus was obtained were curetted as controls, without any local reaction in the uterus or parametrium. This does not disprove, however, the mass of clinical evidence as to the danger of spreading the cocci by opening up avenues in the protective zone, but goes to show that the virulence of the streptococcus differs, as do the culture powers of the soil."

Ideal results in all cases cannot be secured by any known method, but where the choice between the lesser of two evils must be made, or if the greatest good to the largest number is to form the basis of treatment, then localized interference of any description is unjustifiable save in those rare instances where there is undue delay on the part of the uterus in discharging its contents. The term "undue delay," however, must be considered in a relative sense as applied to individual patients. It is quite evident that a professional attendant with a full appreciation of the localized pathology is much more apt to give nature's efforts extra time, and still more time, to secure the desired result than the man who allows his judgment to be swayed by the doubtful character of a patient's symptoms.

Briefly stated the active local treatment of septic abortion with comparatively few exceptions is unscientific and illogical, and clinical experience has shown that as a routine procedure it is unwarranted in practice.

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THE PREAPOPLECTIC PERIOD AND TREATMENT OF APOPLEXY.[1]

BY ALFRED GORDON, M.D., Philadelphia.

Under the name of preapoplectic period is to be understood a more or less considerable period of life during which there are indications of possible apoplectic seizures in the near or remote future. The knowledge of such a possibility is of extreme practical value, as therein lie the directions for proper prophylactic measures and for avoidance of ultimate catastrophe.

Degenerative changes of the walls of blood-vessels are the fundamental cause of rupture of the latter. But what causes vascular degeneration and what are the earliest clinical signs of possible changes in the arterial walls? At what period of life could the latter be detected, and what constitutes the proper warning of oncoming changes? All these problems are intimately associated with the study of the above-mentioned preapoplectic period of life.

If arterial alteration is the *sine qua non* of apoplexy it is important to detect it directly and as promptly as possible, or indirectly through its influence on organs and tissues. Clinical experience teaches that enlargement of the cardiac area of dulness, signs of cerebral arteriosclerosis, also arteriosclerosis of kidneys, especially in individuals inclined to corpulence and functional bowel disturbances, are all signs suggesting eventual hemorrhage in the brain. But long before the peripheral arteries commence to be perceptibly sclerosed a permanent high blood-pressure discloses the existence or at least the tendency to arteriosclerosis. Hypertrophy of the heart in such cases is quite frequent. That cerebral arteries are undergoing similar changes is manifest from an array of symptoms indicative of disturbed cerebral functions. They are: vertigo, amnesic phenomena, such as forgetting recent events and names, continuously interrupted sleep, change of disposition and of moods, sensation of heat in the head; finally motor and sensory disturbances of a transient character in hands

[1] Read as part of a Symposium on Apoplexy before the Philadelphia County Medical Society, December 11, 1918.

or feet, or more frequently on one side of the body (arm and leg). The latter phenomenon is perhaps one which is frequently overlooked. It is due to a spasmodic closing of cerebral blood-vessels and can be aptly compared to a condition which has its legitimate place in medicine, and is known as "intermittent claudication." The analogy is evident if we apply the conception of the latter phenomenon to what occurs in the brain when we observe intermittent, temporary, or transient attacks of hemiplegia or monoplegia. These attacks may be accompanied by aphasia of equally transient character. Instead of complete motor hemiparalysis there may be only hemiparesis or only a very slight weakness. Sometimes there may be repeated attacks of paresthesia on one side, and the patient will say his arm or leg has gone to sleep, but each such sensory attack usually leaves a slight feebleness on the same side.

An analysis of all such cases (see Spasmodic Closing of Cerebral Arteries and Apoplexy, *Journ. of Nerv. and Ment. Dis.*, August, 1914) demonstrates the fact that brief attacks of apoplectiform nature, which repeat themselves in the life of an individual, from which he recovers partially or completely, are an indication first of an unstable irritable state of the cerebral arteries, next of an imminent apoplectic seizure which will eventually occur in the life of such an individual. The intermittent apoplectiform attacks could be considered as premonitory signs and warnings of eventual complete occlusion or rupture of the cerebral vessels by a diseased process gradually developing in the vessel walls themselves.

Arteriosclerosis of the viscera is manifested in the kidneys by albuminuria, especially in obese and corpulent individuals. Monakow found kidney disease in 30 per cent of his apoplexy cases. Meteorism after meals, feeling of oppression and pain in the abdomen, shortness of breath due to pressure on the diaphragm, and constipation, are common in intestinal arteriosclerosis, which Ortner calls intestinal angiosclerotic dysphagia. When all such evidences of a diseased vascular wall are present in a persistent manner, it must always be borne in mind that every increase in the heart's action and in the blood-pressure may become dangerous: physical overexertion, psychic excitement, indulgence in food, in stimulants, and other excesses—all may induce a rupture of a vessel, hence an apoplectic attack. All factors that lead to degenerative arterial changes, such as syphilis, alcohol, lead, and other influences, place a given individual in a potential preapoplectic state. Otherwise speaking, individuals whose mode of living or acquired noxious extraneous influence (syphilis, etc.) produces arterial changes which reveal themselves in persistent manifestations with regard to blood-pressure, to disturbed visceral functions, to transient but repeated cerebral phenomena enumerated above, such individuals are constantly in a state of imminent apoplexy. They are genuinely in a preapoplectic state. The latter may exist many years. The duration of this period will depend largely upon the proper appreciation of its various phenomena and consequently upon the judicious management of all its manifestations. The knowledge of the existence of such a phase of life and of its fluctuations is of a preeminent practical value. Its management is too evident to dwell upon. Prevention of morbidity of tissues and organs is in the largest majority of cases not only a possibility but a strong probability.

TREATMENT OF APOPLEXY.

The treatment of the apoplectic state itself depends largely upon the etiological diagnosis, which should be made as accurately as possible. It is a difficult matter to determine at first whether we deal with a hemorrhage or with an arterial obstruction, and still the immediate management depends upon this important discrimination. When, for example, a hemorrhage occurs, the patient's head must be somewhat raised and the body placed on the back or on the non-paralyzed side, in order to reduce the blood-pressure within the cerebral vessels or to avoid conditions which are likely to increase the pressure. In case of arterial oblitera-

tion the position should be different: the head must be lowered or the entire body laid flat. Furthermore, in cerebral hemorrhage there is usually a flushed face and a full, strong pulse. In such cases bleeding is indicated. Ice applied to the head may relieve congestion. In case of embolism or thrombosis bleeding and application of ice are strongly contraindicated, since the cerebral ischemia caused by the arterial occlusion will be enhanced by the application of these two measures.

In all cases of apoplexy physical rest is of utmost importance. At once the patient must be put to bed, all clothing loosened, especially at the neck. Flexion of the neck should be avoided, so as to avoid compression of the veins, which will interefere with the return of blood from the head.

Venesection, which was regarded by the older writers as the most important factor in the treatment, especially in individuals with strongly pulsating radial and carotid arteries, cannot be indiscriminately applied. Even Trousseau, who at first bled the patients in all cases, later changed his views. Loss of blood may weaken the heart's action and thus increase the hemorrhage into the brain. On the other hand, it has been shown in a number of cases that its influence on brain pressure is not greatly beneficial. At all events the use of venesection should be done with discrimination in cerebral hemorrhages; its indications are a strong heart, incompressible pulse, full arteries, and flushed face. Under no conditions should it be practiced in cases of a dilated and irregular heart with softness of the pulse. Neither can venesection be used in apoplexy from arterial obliteration, because if used the weakening of the heart produced by it will favor the extension of the obstruction.

Lowering of blood-pressure can be accomplished not only by venesection but also by lumbar puncture and withdrawal of a moderate quantity of cerebrospinal fluid. Compression or ligation of the internal carotid artery on the side of the lesion can be used in extreme cases after other measures have failed.

In cerebral hemorrhages ergot administered subcutaneously will promote contraction of the blood-vessels. Purging also is a valuable procedure by filling the blood-vessels of the intestinal canal and thus influencing favorably the cerebral circulation. Croton oil placed on the back of the tongue is a very convenient purgative.

To induce further contraction of the cerebral vessels in cases of hemorrhage the application of mustard plasters to the nape of the neck is a useful procedure, as by dilating the surface vessels the blood will thus be attracted from the brain. Great caution should be exercised in using heart stimulants. In cases of collapse and weakness of the heart, ether, camphor, and nitroglycerin should be administered hypodermically. Alcohol should be avoided except in extreme cases.

No medication should be given by the mouth during the comatose state. In case convulsions are present, since they are apt to increase the intracerebral bleeding they must be arrested. Injections of chloral by the rectum may stop the convulsions.

With return of consciousness the treatment should be symptomatic. Careful nursing and appropriate alimentation are essential. Milk, eggs, fruit juice, and water are the only articles permitted for several weeks after the onset. Restlessness and insomnia are combated by bromides or small doses of veronal. Weakness of the heart will be treated with mild stimulants, such as ammonia. Alcohol, tea, and coffee should be avoided unless there is marked cardiac depression. As internal medication, iodides are advisable in both hemorrhage and arterial obliteration, especially in those cases in which there is evidence of luetic arteritis. In the latter case arsphenamin and mercurials in addition to the iodides should be given at the earliest possible phase of the disease. Any of the methods of administration of the arsenical preparations may be used. Personally I have obtained satisfactory results with the intraspinal injections of neoarsphenamized serum by the method of Swift and Ellis. At present I have under observation several

cases of luetic hemiplegia treated with intramuscular injections of neoarsphenamin, and the degree of improvement has been as satisfactory as in similar cases with the intraspinal procedure.

Iodides have been considered useful in arteriosclerosis. According to Müller and Inada the effect of the drug is to diminish the friction of the blood against the inner wall of the vessel and thus to facilitate better circulation in the cerebrum. As an absorbent and alterative iodides are considered by the majority of investigators indicated in degenerative states of the vessel walls from any source, syphilis included. Hence in luetic arteritis with apoplexy, iodides may be administered and for a long period of time. On the other hand there is no absolute certainty about this alleged influence; at least no incontrovertible proof has been supplied. The drug therefore should not be looked upon as a remedial agent from which certain results are to be obtained. Sodium iodide has proven in my hands just as effective as potassium iodide, and since the former is better assimilated and creates less gastric disturbance than the latter, it is to be preferred.

In cases of arteriosclerosis with a high tension pulse, nitroglycerin is a genuinely useful drug. It is advisable to commence with small doses such as gr. 1/200 t. i. d. and gradually increase to gr. 1/100 t. i. d. The advantage of the smaller doses lies in the possibility of administering it over a long period of time, which is essential in treating a pathological process of a chronic character.

In the management of cases of apoplexy, especially in those in which the coma is prolonged, great care must be taken of the patient's skin to prevent bed-sores. Extreme cleanliness, change of position of the limbs from time to time so as to prevent prolonged pressure, regular emptying of bladder and rectum in the most careful manner so as to avoid prolonged contact of the excretions with the skin, great care in the application of heat to the skin so as to avoid its blistering and sloughing—all these measures must be borne in mind. Not only during the comatose state but also for some time following it, as long as the patient is bedridden, the possibility of occurrence of decubitus must be guarded against. If the latter takes place, the healing process is slow and does not readily yield to treatment.

Attention will now be called to a special pathological consideration from which conclusions will be reached as to the possibility of surgical intervention during the comatose state caused by arterial obliteration and especially by hemorrhage. Coma in cerebral focal lesions is not only the result of a sudden tear of a blood-vessel and of the resulting clot, but also of another element which had not been sufficiently emphasized. I mean the simultaneous suspension of function of both hemispheres as a result of bilateral compression caused by the hemorrhage. Otherwise speaking, in complete coma the sound hemisphere is equally compressed against the inextensible cranial wall as a result of increased volume of the hemisphere which is invaded by a hemorrhage. Consequently the state of the normal hemisphere must be taken into consideration in the causation of the comatose state during apoplectic insults. Indeed, in a number of cases of cerebral hemorrhage with complete coma the unaffected hemisphere was found pushed externally, lying close to the cranial wall; it is diminished in size and its convolutions are flattened. On the affected side the increased volume of the hemisphere is due not only to the extravasation of blood, but also to the edematous state (probably of inflammatory nature) which usually develops a few hours after the onset. In cases with arterial obliteration, in which coma may be absent or is incomplete—or else it may increase during the first few days so as to become complete—a sort of a collateral edema develops either in the vicinity of the lesion or in the entire hemisphere, so that, if sufficiently developed, it produces a compression of the normal hemisphere and consequently a comatose state.

P. Marie *(Presse médicale,* No. 45, 1914,

p. 431), basing himself on these anatomical findings, advanced the view that a prompt surgical intervention, such as a decompressive cranial operation on the side opposite to the lesion, should bring relief to the intracranial pressure. Some surgeons have already performed trephining and osteoplastic operations in cases of cerebral hemorrhage—to mention a few names: Horsley, Krause, and Cushing—but they all operated on the side of the lesion. The latter attempted even to remove the clot from within the cerebrum. The results of their work are, although encouraging, nevertheless far from conclusive. Marie's arguments against this operation are: the hemorrhagic hemisphere no more being held up by the cranial vault, may tear and open into the arachnoid, or at least the blood-vessel which had ruptured may be without a clot and the bleeding will thus continue. If, on the contrary, the decompression is performed on the normal side, there can be no tearing of brain tissue, because the latter is healthy; there can be no recurrence of hemorrhage, because the hemorrhagic focus is compressed by the neighboring tissue. The decompressive osteoplastic portion on the *sound side* should be sufficiently large and removed over the temporoparietal region. General anesthesia should be avoided. The dura is not to be opened. In his few cases Marie observed disappearance of coma in a very short time, and the amelioration of all the grave symptoms was striking.

In a contribution entitled "Ventricular Hemorrhage" (*Archives of Internal Medicine,* March, 1916, p. 343) I reported a series of anatomo-clinical cases of primary ventricular hemorrhage, in one of which life was prolonged to twenty-four days with remarkable amelioration of the symptoms by a decompressive operation such as described above. The operation was consented to only on the fifth day after the apoplectic seizure, viz., after five days of a comatose state during which the brain pressure was continuous. It seems evident that if a decompression on the sound side is to be undertaken, it must be done promptly after the onset.

The treatment of the postapoplectic condition is that of the resulting hemiplegia with or without aphasia. This subject must be dealt with at length in a special chapter. A brief summary, however, may be presented here. The treatment of hemiplegia should begin as soon as the general condition permits, and this is usually in the second week. Passive and active movements in addition to massage are the only means from which improvement can be expected. Massage is the most important one. It is a valuable procedure not only in recent but also in old hemiplegias with contractures. It prevents, when instituted early, the rapid tendency to contractures by improving the nutrition of the muscles and their tendons; it prevents ankylosis of the joints and the paresthesias which so frequently accompany the paralysis. Systematic reëducation of movements of the affected limbs is important; the patient must persist in exercising them frequently. Contractures may also be treated by warm baths followed by massage and passive movements. Electricity should be avoided in organic hemiplegia, as it is apt to hasten or increase the contracture of the muscles. For the same reason the drug which has a tendency to increase the tonicity of the muscles should never be given in hemiplegia, and this is strychnia. To combat the rigidity of the limbs various surgical procedures have been devised. Foerster's operation on the posterior roots, "muscle isolation" by the methods of Schwab and Allison, also by that of Stoffel, tenotomy, tendon transplantation, are a few which deserve mention. The aphasia which sometimes follows an apoplectic seizure may be improved by reëducation of speech, and favorable results have been reported. No special rules can be given for the treatment of the mental condition of hemiplegia.

In conclusion may I be permitted to refer again to the preapoplectic state, described above, as the most important phase of the subject under discussion? It is the treatment of morbid processes which develop in an insidious manner over a long period of

life, and which lead to the final catastrophe manifested in cerebral hemorrhage, that requires our greatest attention. Diminution or, rather, avoidance of arterial irritability and degenerative changes is the prime factor in the management of cases of this character. It belongs to the domain of metabolic changes, of accumulation of toxic products in the organism, to the domain of food, of drink, of habits, of hygienic and dietetic elements in general, of excesses, physical and mental. Preventive measures in this particular direction are of greater importance with regard to the pathological conditions in the preapoplectic state than in many other forms of human ailments.

THE APPLICATION OF SILVOL WITH THE POSITIVE GALVANIC POLE IN ATROPHIC RHINITIS AND OZENA.

BY OTTO T. FREER, M.D., CHICAGO, ILL.

In the management of the chronic nasal suppurative states called ozena and atrophic rhinitis, where there is no complicating accessory nasal sinus suppuration (this is true of most of these cases), the cataphoric application of silvol is a routine part of the treatment upon which I have learned to place reliance, which has always improved the condition and which in several cases has brought about a cure. The cataphoresis with silvol must be accompanied by other measures to remove and prevent the formation of dried pus—that is, the typical scabs and crusts which adhere to the mucous membrane. The entire plan of treatment is as follows:

The nasal interior is first lightly anesthetized with a cocaine spray. The crusts are then loosened with a wet swab on an Ingals copper nasal swab carrier, which is a four-cornered copper rod tapering to a slender end, serrated to hold the cotton swab. The scabs are then washed from the nasopharynx and nares by passing through the nostrils a Freer hard-rubber nasal irrigator tube connected by a Eustachian catheter connection and 18 inches of pure gum rubber tubing to a 6-ounce, white rubber bulb syringe. The hard-rubber Freer nasal irrigator is simply a hard-rubber Eustachian catheter closed at the distal end and possessing three minute holes near its distal end which permit three fine right-angled jets to wash the mucus.

When all of the nasal and nasopharyngeal mucosa is entirely clean the silvol is applied as follows: Another Ingals copper nasal swab carrier is covered to within an inch of its distal end with snugly fitting pure gum tubing in order to insulate it. A cotton swab is then wound on the bare end of the swab carrier, dipped in a strong silvol solution (60 grains or more to the ounce), and used as the positive pole of the electrical connection. The negative pole is a common felt electrode covered with a flat sea sponge to limit irritation of the skin. The negative, sponge pole is then applied to the right cheek, if the outer nasal wall of the right nares, the right half of the nasopharynx, and the left side of the nasal septum are to be treated; to the left cheek, if the left outer nasal wall, the left half of the nasopharynx, and the right side of the nasal septum are to be treated; the idea being to have a direct current through the mucous membrane under treatment. The positive (silvol) pole swab carrier is now connected to the positive galvanic cord simply by slipping the distal metallic tip of the cord underneath the proximal, close-fitting end of the rubber tube jacket that insulates the copper rod. The elasticity of the rubber holds the tip in place against the rod and gives a perfect connection. The negative, sponge electrode for the cheek is connected to its cord in the usual manner. The sponge is then applied to the cheek and the silvol swab is introduced through the naris to the nasopharynx, a direct galvanic current of five milliamperes being then slowly turned on with the rheostat, the cur-

rent being obtained either from a wall plate or a galvanic battery. The swab, with the current passing through it, is then slowly drawn forward over the mucous surface to be treated, the application lasting from three to five minutes, several fresh swabs saturated with the silvol solution being used. There is no danger of a cauterizing effect; the positive pole does not cauterize.

Those who have no galvanic wall plate can make a perfect battery by assembling fifteen ordinary dry cells, and connecting them with a milliamperemeter and a rheostat. The latter is not a necessity, but avoids discomfort from the sudden application of the current.

After all of the diseased mucous membrane has been treated by the silvol swab carrying the galvanic current as described, the entire nasal interior is swabbed with an ointment of lanolin (anhydrous) 1 ounce, vaselin oil 1 ounce, boracic acid 60 grains.

For home treatment the patient is told to get the Freer nasal irrigating outfit[1] described, and is instructed in its use. He is also to get an Ingals swab carrier or a Buffum ear applicator and swab his nose with the ointment twice a day.

A GENERAL SUMMARY OF THE THERAPEUTICS OF LEPROSY.

BY CHARLES GREENE CUMSTON, B.S., M.D.,

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(Concluded.)

Iodoform has been especially employed by Diessing, Montel, and Leboeuf, and appears to have a happy effect when used as local injections around the leprous lesions, in a 10-per-cent suspension in olive oil. The oil is boiled in a porcelain container and the iodoform is incorporated in it as it is withdrawn from the fire.

Diessing injects 2 Cc. of the emulsion around the lepromata, and an improvement, he says, will be noticeable at the end of about five weeks. The pigmented spots disappear, the process beginning at their center, the nodules flatten down, and the ulcers clean up and become granular. If this writer is to be relied upon the bacillus lepræ disappears from the nasal mucosa after a few months of treatment.

In four patients treated by this method, Montel obtained satisfactory results, but this writer associated chaulmoogra oil with the iodoform injections. In one patient who was given sixty injections around the nodules and lepromatous patches so as to circumscribe them, the skin in these areas became soft and elastic, while the tuberous lesions underwent regression. Two years later improvement was still maintained. In conjunction with the treatment, Montel orders daily hot baths.

Iodoform appears to act by stimulating phagocytosis and locally provoking a reaction of defense. The treatment should be interrupted from time to time and the urine carefully watched.

Following the example of Diessing and Montel, Leboeuf has resorted to iodoform treatment, but he believes that it should be looked upon as simply an adjuvant to chaulmoogra oil. He remarks that its general action is inferior to KI, and therefore in most cases its part is only an auxiliary one.

I shall now consider the organic arsenical compounds in the treatment of leprosy, and will first refer to arsenobenzol, whose fortune has been varied. Giosseffi seems to have been the first, so far as I know, to have employed this drug in leprosy in a case in which the reaction of fixation was negative with the syphilitic antigen, and

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[1]The Freer nasal irrigating outfit and the Ingals swab carriers may be had of F. A. Hardy & Co., 10 S. Wabash Ave., Chicago.

found that it had absolutely no effect upon the leprous lesions. Isaac, Senator and Benda arrived at the dose of 2 grammes of arsenobenzol in six patients without noting any favorable result or otherwise. Ehlers comes to the same conclusion.

However, Monte Santo says that he obtained the cure of one patient out of four suffering from the ulcerating type of leprosy, and concludes that large doses of arsenobenzol have a destructive action on the bacillus lepræ.

The Verteuil brothers have given intramuscular injections of this product, and after two months' treatment noted a decrease in the size of the nodosities. In one case, a tawny patch occupying nearly the entire abdomen disappeared almost completely.

Plyri, of Barcelona, concludes from his experience with "606" in leprosy that this therapeutic agent is not a specific, although he has seen the leprous lesions favorably influenced by its exhibition. He farther states that its action appears to him to be more powerful than that of chaulmoogra and its derivatives when employed alone.

According to the same writer, recent tuberous forms of lepra and lesions of the mucosa are those which improve more markedly, but he proscribes the drug in the anesthetic types unless they are recent. Plyri remarks that if the reaction of fixation is positive before treatment is begun it will not change until "606" has been exhibited for over a year.

Brault, of Algeria, has used arsenobenzol in a case of leprosy having a Brazilian origin, and he obtained an excellent improvement which showed itself as follows: The first intravenous injection of 50 centigrammes arsenobenzol produced a momentary reappearance of the sensibility in the majority of the cutaneous leprides present. After a second injection of the same dose, the various cutaneous lesions became markedly paler, and in other leprides the anesthesia decreased. Some weeks after the third injection the infiltration which existed in the patient's face disappeared and the cutaneous lepromata became still paler, but the enlarged cutaneous nerves did not change in size and the anesthesia remained more or less marked in the lesions undergoing regression. Both before and after treatment examination of the nasal mucus revealed the presence of the bacillus lepræ. I would also add that the "606" treatment was reënforced by inunctions of a mixture of equal parts of chaulmoogra oil and eucalyptol.

Wellmann has treated seven cases of leprosy with arsenobenzol, and in four he observed either a partial or total reaction in the leprous nodules. In one slightly advanced case the bacillus lepræ disappeared after the injections. Wellmann concludes that if the disease is not far advanced, arsenobenzol should be exhibited because quite a favorable result may be anticipated, and he also thinks that this organic arsenical compound is superior to all the others from the view-point of bacteriolysis.

Sands has treated thirteen cases with arsenobenzol with eight failures, considerable improvement in two, and an insignificant change in two other patients. The first two cases were anesthesic leprosy, the others presented the mixed form of the disease. The tuberous forms of Sands's cases were not influenced by the arsenic treatment, and he found Hansen's bacillus in the nasal secretions and elsewhere after intravenous injections of 60 centigrammes of arsenobenzol.

Veillon and Lagane have treated two patients with mixed leprosy by intravenous injections of arsenobenzol, and they conclude from their experience that the drug has a rather nefarious action on the lesions than otherwise. Both patients offered very marked reaction to the drug, but this fact appears to me to corroborate Wellmann's opinion as to the bacteriolytic action of arsenobenzol.

Other writers have had equally fruitless results from the use of the drug given intravenously.

Some Brazilian practitioners, among others Amaral and Paranhos, have used atoxyl in leprosy. Having commenced at the dose of 20 centigrammes administered

every other day, they progressively increased the dose to 3 grammes without observing any untoward effects, but no appreciable action on the lesions was noted.

On the other hand, Hallopeau and Aine obtained a notable regression of the lesions with atoxyl in a serious case of leprosy with multiple manifestations. They at first gave two injections of 40 centigrammes each of the drug, followed later by two of 25 centigrammes each, making a total of 1 gramme 30 centigrammes of atoxyl. Following the first two injections a great improvement in the ulcerations of the nose and lips ensued, and finally only a trace remained. At the patient's request they made a new series of injections to the number of four of 25 centigrammes each, given every third day, after which one injection was given each week.

This last series of injections very favorably influenced the ulcerations of the limbs, which disappeared, while at the same time the patient, who at first was very weak, became decidedly stronger.

Brault of Algiers has employed several organic arsenical compounds in the treatment of leprosy and finds that atoxyl is superior to all. He records three cases in which he obtained notable results, and the drug was well tolerated by all three patients.

Noc also recommends atoxyl, and by serial injections he has obtained cicatrization of the ulcers and an increase in the percentage of hemoglobin. Only the lepromata did not undergo any appreciable change from the treatment.

Raymond has treated some cases of leprosy with sodium cacodylate and noted that the first effects of the drug were a rapid improvement of the general health, an increase in weight, and disappearance of the cachectic symptoms. This was followed by cicatrization of the ulcers, and the lepromata diminished in size.

Five to ten centigrammes daily were given for a long time, even in subjects with albuminuria of varying degrees, without causing intolerance or increase in the albumin.

Although this drug cannot be regarded as a specific, its use in leprosy is to be advised, and when associated with more potent remedies sodium cacodylate may contribute to the regression of symptoms which refuse to respond to other medication.

In order to be complete I shall now briefly refer to some miscellaneous therapeutic agents which have been employed in leprosy from time to time, the first of which is ichthyol, recommended by Unna, given internally at the dose of 75 centigrammes at first and increased to as much as 3 grammes daily if required.

Brun of Beyrout has published some cases in which ichthyol seems to have really been effectual. In all he treated five patients with tuberous leprosy, and this writer was able to progressively reach the daily dose of ten grammes of the drug without any untoward effect.

Dubreuilh has also advocated ichthyol exhibited in the form of pills, capsules, or simply in drops at the daily dose of from 2 to 4 grammes. At the same time he employs inunctions with a 5-in-40 acid pyrogallic ointment and an ointment of ichthyol.

Carbolic acid has been employed both *intus* and *extus* by Danielsen, Boeck, Besnier, and Lelois, but as the results obtained were ***nil,*** this drug has fallen from the ranks of remedies used in leprosy.

According to Danielsen, sodium salicylate destroys the bacillus lepræ. The drug has been most successful during the *congestive phases* of the affection. It is also of service in articular attacks of leprosy, as well as in relieving patients suffering from the sensitivo-painful forms of leprous polyneuritis.

Among those who have employed this salt on a very large scale, I would mention Amaral and Paranhos in particular, who state that they have had "magnificent results" at the hospital at Sao Paulo, Brazil.

Montoya y Flores compares the action of sodium salicylate with that of erysipelas, to which he attributes some spontaneous cures of tuberous leprosy, as some other writers have also done. Flores believes that sodium salicylate is one of the best treatments of the disease.

Kalindero's treatment consists in the in-

ternal exhibition of crude petroleum in the daily dose of 2 grammes and general inunctions with the same product.

Airol has been employed by Fornara in 10 per cent in glycerin hypodermic injections, or better still in a suspension in olive oil. The injections are made *loco dolenti* and forced into the center of the tubercles, patches, and anesthetic areas, graduating the dose from one drop to 1 or 2 Cc.

All the lesions of the mucosa are treated either with solutions of airol or with the powder, according to the regions to which the applications are made.

When the amount of airol absorbed is large, a white line appears on the gums which becomes black and finally vanishes.

I have now finished with the therapeutics of leprosy, and have purposely omitted any mention of serum treatment or treatment with antileprous immunizing bodies because the results so far obtained have either been *nil* or so indefinite that no conclusion can possibly be drawn. The great extent of leprosy at present should, however, cause the medical profession of all countries to be at least informed about this disease and its treatment, and in concluding this already long communication I shall venture to make a few general remarks.

The excellent results obtained from proper hygiene in leprosy must not cause one to reject either medical or surgical treatment of the disease, because when properly directed treatment with drugs unquestionably produces a favorable evolution of the divers leprous lesions. Although durable, even indefinite, spontaneous remissions may take place, the data we have now on hand show that a large share should be unreservedly attributed to medical treatment in the happy results obtained in a large number of cases.

Although the specific action of any one drug so far employed in this disease cannot be affirmed, there certainly are some which exercise a favorable influence on the lesions, among the numerous remedies extolled as antileprous. This influence may, perhaps, be explained in some instances by the bacteriologic and tonic properties of some of these drugs. It is perfectly safe to say that all forms of leprosy are benefited by treatment. Leprosy of the integuments, whose passage to the nervous form of the disease is regarded by some authorities to be one of the manners of cure of the affection, is that on which we have the surest hold, as its lesions lend themselves to treatment more readily than others.

Nevertheless, tropho-venous leprosy is susceptible of improvement from medication and surgical interference by either directly attacking the nerve trunks, the seat of hyperplastic neuritis, or removing or correcting certain trophic disturbances. These combined with tonic medication will aid wonderfully in dealing with anesthetic leprosy.

From the improvement—occasionally so complete—that is the outcome, these various therapeutic measures should be taken into serious consideration, hence if they are resorted to *early in the evolution of the affection* and with perseverance, the contagious power of leprosy may be diminished in not a few cases.

3, RUE BELLOT, GENEVA, SWITZERLAND.

MANTOUX REACTION IN CHILDREN.

REISS, in the *Archives of Pediatrics* for December, 1918, in concluding an article on this topic, states that the intracutaneous tuberculin test when carefully performed seems somewhat more reliable than the von Pirquet test.

A reaction to be termed positive must present a central papule at least 0.2 x 0.4 cm. in dimensions and have a surrounding areola.

The injection of simple normal salt solution intracutaneously offers an opportunity for studying the sensitivity of the skin.

Tuberculous meningitis cases *apparently* do not respond to cutaneous tuberculin tests (his four cases after repeated tests uniformly gave negative results). [This is also true of the von Pirquet test.—ED.]

The presence of posterior cervical adenopathy in children is highly suggestive of tubercular infection.

EDITORIAL.

THE ADMINISTRATION OF FLUIDS BY OTHER MEANS THAN BY THE MOUTH AND THE RECTUM.

It is not many years since Hirshfelder of San Francisco first drew the attention of the profession to the value of hypodermoclysis, which has now become universally recognized as a measure to be resorted to under widely different conditions, the chief objection being due to the pain caused by the insertion of the needle and the bulk of the fluid.

The value of intravenous injections is also well recognized, but the difficulty of their administration in patients with collapsed veins or who are very fat is so great in many cases that it cannot be overcome.

Comparatively recently the introduction of fluids into the peritoneal cavity, or through the fontanel in the skull of infants, has attained considerable popularity, and we have already called attention to these methods which are to be used for the purpose of combating conditions in which there has been a rapid loss of fluid from the body.

The substances which are commonly introduced are sodium chloride, sodium bicarbonate, dextrose, and blood, or blood serum. Occasionally drugs of a stimulating nature have been added to the fluid.

When it comes to apparatus, little is required, since all that is needed is an irrigating flask containing the solution, a rubber tube, and a long needle, the fluid being introduced by gravity.

One of the difficulties in employing the solution of bicarbonate of soda is that boiling it for the purpose of making it sterile results in its being changed into the irritating carbonate. This can be corrected by passing through the solution carbon dioxide, but as a matter of fact few of us have the carbon dioxide at hand for this purpose.

When infants are injected by the subcutaneous route, from 100 to 200 Cc. are usually employed. Those who have injected the fluid through the abdominal wall, by means of a needle introduced just below the navel, have given about the same quantities at a temperature of 100° and in large children as much as 300 Cc., repeating the injection in twenty-four hours. Both normal solution and dextrose solutions can be used in this way either to combat hemorrhage or acidosis.

The same apparatus can be used for making injections in the posterior portion of the superior longitudinal sinus. As we have pointed out in these pages at an earlier date, this method may also be used in infants for the extraction of blood for the Wassermann test and for the injection of salvarsan in weak solution.

AN ACTIVE METHOD OF TREATING ARTICULAR RHEUMATISM.

Readers of the THERAPEUTIC GAZETTE will remember that many months ago we called attention to certain investigations which had been carried out in this country concerning the effect of injecting certain proteins subcutaneously or intravenously into patients who were suffering either from acute articular rheumatism or acute or subacute gonorrheal rheumatism.

These investigations seem to prove that just as good results were obtained with proteins which had no relationship to the organism producing the disease as did proteins which were directly derived from such microörganisms, and the researches of Miller and Jobling were quoted in particular. For these reasons our readers will be interested in a paper which is published in *La Presse Médicale* of September 23, 1918, by Nolf entitled "The Treatment of Acute Arthritis by Salicylate of Sodium Associated with Intravenous Injections of Peptone."

It is not possible in the brief space which we have to quote this article *in extenso*. He speaks of the employment of various serums and vaccines derived from different sources, and records cases in which the combined treatment produced excellent results.

Peptones are of course protein substances, and, therefore, his paper has a close association with the ones we have referred to. All of these papers go to show that those who have employed the phylacogens in such cases have been entirely correct in their clinical observations that these products often produce excellent results. The paper of Nolf, of course, emphasizes the employment of the salicylate of sodium in addition.

Nolf claims that such an associated form of treatment has given him the most excellent results in certain cases of rebellious arthritis due to rheumatism and gonorrhea. He admits that the injection of peptone may produce shock somewhat allied to that condition known as anaphylaxis, and advises the use of adrenalin hypodermically should such symptoms develop.

He also recognizes that there are certain conditions which contraindicate this plan of treatment, such, for example, as valvular lesions which are old and which are accompanied by myocardial degeneration, and particularly in those patients in whom there is impairment of the pulmonary circulation or inflammatory conditions of the lungs.

He also recognizes that the treatment is a somewhat heroic one, and that if the septicemia is grave and the arterial pressure is low, it may be wise to precede the treatment with an adrenalin injection subcutaneously. In such instances he suggests that the peptone be injected subcutaneously or intramuscularly instead of intravenously.

According to Nolf's observations the benefit is immediately manifested, oftentimes within twenty-four hours, and in no case is it delayed longer than forty-eight hours. The injection is not given oftener than once a day and sometimes every other day. The salicylate of sodium seems to have been administered in the amounts commonly employed in acute arthritis and, of course, was given by the mouth.

THE VALUE OF RADIUM WATER IN CHRONIC ARTHRITIS.

The marvelous characteristics of radium and the mysterious properties which it seems to possess have naturally led to its use and abuse and to its employment in cases in which it could hardly be expected to be of value, but improved technique in its employment is showing more and more every day that it has a definite place in the treatment of malignant growths, particularly if they are superficial. Our columns have, from time to time, within the recent past contained articles along these lines.

It has been suggested that radium water —that is, water containing radium emanations—would produce such remarkable changes in metabolic processes as to be of benefit in cases of arthritis which were not due to infection but to disordered nutrition, and it has been tried very largely in this class of patients. In some cases its use has been followed apparently by success and in others by dismal failure, probably because each case differed materially in its causation from its predecessor. Our own experience with radium water has been limited in regard to the number of cases tried, and the results which we have obtained have been *nil*, which is the more interesting in view of the fact that we have employed doses not only of the size reported by some observers but many times greater; as much as 3,000,000 Maché units have been given a day for a week without producing any symptoms of betterment, or indeed any manifestation that any active agent was being taken, except possibly a slight tendency to blueness of the lips, which was so slight as not to be definite enough to be considered the result of the administration of the preparation. We understand that approximately these doses have been used with advantage in the Radium Institute of London.

We therefore note with interest a paper by McCrudden and Sargent in the *American Journal of the Medical Sciences* for November, 1918, upon the "Influence of Radium Water Therapy on Creatinin and Uric Acid Metabolism in Chronic Arthritis."

We note with interest the very large bibliography which is appended to their paper. They analyze 471 cases reported by 13 authors, with the statement that definite improvement occurred in 391, of which 102 were practically cured. Out of 165 cases of gout all but 16 showed improvement. But they admit that despite numerous studies we do not yet understand the rationale of radium therapy in these conditions. Certain investigators assume that uric acid is present in an insoluble form in the blood in gout, and that under the influence of radium this becomes soluble and is therefore easily destroyed or excreted, with the speedy absorption of gouty deposits. Unfortunately for this theory, McCrudden and Sargent were unable to confirm the results reached by those who worked in His's clinic, and they cite other investigations which would seem to confirm their view.

They studied the metabolism of three patients with chronic arthropathies. Space does not permit us to give all the details of their results. They were able only to determine one definite change in metabolism, namely, a slight increase in the rate of creatinin excretion, an effect which persisted for some time after the radium treatment was discontinued. They claim that radium therapy had no influence on the uric acid content of the blood or on the rate of excretion of uric acid, of total nitrogen, or of water, and they do not consider in view of our limited knowledge concerning creatinin elimination that the slight increase in this substance which they noted throws any light upon the problem involved. It is only fair to state, however, that the doses of water which they used were much smaller than we employed, and which we believe have been customary in cases in which success in the treatment of arthritis has been obtained. Their patients received five times a day 3 ounces of water impregnated with radium emanations, then nine ounces containing only 20,000 Maché units, a dose which is infinitely less than the amount which we administered.

Various circumstances prevented the study of our patients along the scientific lines carried out by McCrudden and Sargent, but the point of interest is that their scientific work and our clinical observations seem to be in accord, namely, that water containing radium emanations is not what has been claimed for it in the treatment of arthritic changes due to disordered metabolism.

MOUTH INFECTION.

The highly commendable and skilful search which the dental profession on the part of its leaders is now conducting for focal infections placed in and about the teeth, has led to an occasional success in the cure of intractable affections such as crippling and painful joints, so astonishing and convincing as to throw an enthusiasm into oral work which is not always justified by results. Thus it is by no means uncommon for the patient who consults the surgeon for the relief of a painful foot due to a flattened arch to be referred first to an orthopedist, then to a roentgenologist, who immediately takes a series of pictures of his teeth and their roots, and then to the dentist, who excises the roots or draws the teeth; then to the throat and nose man, who performs upon him many or all of his various ingenious procedures designed for the removal, destruction or ablating of polypoids, or the drainage of cavities with the recovery following these procedures; and ultimately back to the orthopedist for the strengthening of ligaments relaxed by disuse and discouraged by hope long deferred. And thus the cures of chronic invalidism accomplished by thorough oral cleansing have been among the most satisfactory and astonishing of modern medicine. Nor in the careful examination of the patient for

whose disability there is no other obvious and convincing cause should a thorough examination by the dentist be omitted.

Osborne (*New York Medical Journal,* January 18, 1919) shows that it has been proven that mouth infection can cause rheumatism, neuritis, endocarditis, of the most fatal type, boils, carbuncles, various skin diseases, and thyroid gland disturbances. Mouth infection is thought at times to be a direct or indirect cause of ulcer of the stomach, ulcer of the duodenum, appendicitis, pyelitis, acute infection of a kidney, chronic nephritis, chronic endarteritis, and of some mental disturbances. It is logical to presume that if such an infection can cause thyroid disturbance, it could disturb other glands furnishing internal secretions, especially the suprarenals, the pancreas, and the pituitary; and also the blood-forming organs. It seems quite probable that it may cause pernicious anemia, leukemia, and other blood diseases.

Whether the infection is first discovered by the patient's physician or by the patient's dentist, the dentist, accepting the care and responsibility for the patient's mouth, must rapidly eradicate at the earliest possible appointment all points or sources of infection. It is little less than criminal negligence to remove one source to-day, more in one or two weeks, and the final sources in one or two months. If the whole work cannot be done at one sitting, on account of the patient's condition or strength, not on the dentist's account for any reason whatsoever, another very early sitting must be given. The patient may not know, but the dentist should know and does know that the prompt result may mean life; and delay, the early death of the patient from the prolongation of this mouth infection.

Dental appointments should be entirely revised. A dab at this patient and a dab at that, and so on all day, is bad business for the patients. After the first observation to decide the amount of work required, the dentist should give that patient as early an appointment as possible, for a period long enough to finish all of the urgent work—and any and all infection is urgent.

It should not be necessary to state that, infection having been removed, repair work that tends to reinfection should not be placed in that patient's mouth. His mouth is more susceptible to recurrent infection than is a mouth that has never been infected. Both the physician and the dentist should tell the patient very emphatically that eradication of the mouth infection will not immediately cure the distal trouble, even if that trouble was caused by the infection.

The platform on which every physician and dentist must stand is that, no matter what the disease may be, and no matter what the cause of the disease, and no matter how seemingly negligible the part that the infected teeth and gums play in the disease or disturbed condition, it is a danger and a menace to the patient and to his family to allow him to be a carrier of germs of infection, and these germs are frequently the streptococcus viridans, pneumococci, pus germs, and that not well-understood Connellan-King diplococcus. Hence it is the physician's duty to order the surgical removal of mouth infection, and it is the dentist's duty to make an infected mouth clean. The diagnosis of the general disturbance and the cause of the general disturbance have absolutely nothing to do with the case. If such infection is discovered by a physician or a dentist before the impairment of health has occurred, the duty of both is even plainer and is just as positive. Prevention is better than cure, and should be the aim of both professions.

Recently, Duke, after a study of the relation of one infection to another, came to the following conclusions: "(1) When a person has several infections, each may increase the severity of the others whether due to the same or to different infecting microörganisms. (2) Acute exacerbation of one chronic infection may stir up other apparently latent infections into activity. (3) The removal of one infection may, under favorable conditions, be followed by spontaneous healing or improvement in others. (4) If minor infections are properly taken care of, those that appear

serious may yield more easily to treatment."

Pivoted teeth, crowns to the gums, and bridges to the gums are a menace to health; infection sooner or later almost always occurs at these regions of the gums. Therefore the dentist must refuse to put such artificial work into even healthy mouths, on account of the future of the individual so adorned. Such work may be beautiful to-day, but pitiful in a few years. We must also recognize that overfilled teeth often die from some trophic disturbance due to the metal, and they may become a menace. Hence the necessity of the determination that such teeth are alive, or, if dead, whether or not they are infected.

In addition to diseases of the teeth requiring skilled attention of the dentist, infection of the gums which is associated with danger to the patient and others requires serious consideration. Indeed this topic is of such great importance that all schoolchildren should be subject to as careful and rigid an examination as to the mouth and teeth as now obtains in regard to their eyes. It is at this period of life that preventive treatment is most promising, and there is evidence to show that such early treatment may prove the most potential single element in the struggle against tuberculosis.

HOW ANESTHETICS PRODUCE ANESTHESIA.

Upon the ever fresh subject of anesthesia numerous articles will be found in current literature, practically since the first introduction of this beneficent adjunct to the surgeon's armamentarium—new substances, new methods, new apparatus, and new discussions and pronouncements as to the method by which anesthesia is produced. Thus Burge recalls the circumstance (*American Journal of Surgery,* January, 1919) that Bibra and Harles in 1847 held that anesthesia was due to the dissolving and direct removal of the fat-like substances or lipoids from the brain cells by the anesthetic administered. Meyer and Overton in articles contributed last year believe that the narcotics of the methane series produce their characteristic effect by going into solution in the lipoids of the nervous system.

Bert and Arloing have demonstrated that exudation is decreased during anesthesia, and that this decrease is more extensive with a powerful anesthetic such as chloroform than with a less powerful anesthetic such as ether. Burge has conducted a research with the idea of determining how anesthetics decrease oxidation. He had already found that whatever increased oxidation in the body produced a corresponding increase in catalase, an enzyme possessing the property of liberating oxygen from hydrogen peroxide, by stimulating the liver to an increased output of this enzyme, and that whatever decreased oxidation produced a corresponding decrease in catalase by decreasing the output from the liver, and by the direct destruction of the enzyme. Hence the conclusion was drawn that catalase is the enzyme principally responsible for oxidation in the body. Stated more specifically, the present investigation was begun to determine if anesthetics produce a decrease in the catalase of the blood and hence of the tissues parallel with the decrease in oxidation, and if this decrease is proportional to the depth of the anesthesia.

The anesthetics used were ether, chloroform, nitrous oxide, and magnesium sulphate. These widely different kinds of narcotics were chosen intentionally. The chloroform and ether were administered by bubbling air through these anesthetics in a bottle which was connected by a rubber tube to a cone adjusted to the snout of the animal; the magnesium sulphate anesthesia was produced by the subcutaneous injection of 7.5 Cc. of a 20-per-cent magnesium sulphate solution per kilogramme of body weight; and the nitrous oxide anesthesia by administering a mixture of nitrous oxide in the proportion of 1 to 5, or 80 per cent nitrous oxide and 20 per cent oxygen. Chloroform decreased the catalase of the blood 28 per cent during the first fifteen

minutes of anesthesia, 34, 38, and 36 per cent during the succeeding fifteen-minute intervals. Nitrous oxide decreased the catalase of the blood 11 per cent during the first fifteen-minute interval, 14, 19, 17, and 18 per cent during the succeeding fifteen-minute intervals. By examining the curves marked ether and magnesium sulphate, the rate and extent to which these anesthetics decreased catalase could be seen.

If narcosis is due to decreased oxidation, and if this decreased oxidation in turn is due to a decrease in catalase, then the destructive effect of an anesthetic on catalase should be an index to the character of anesthesia produced by the anesthetic in question. By comparing the rate and extent of decrease produced by the different anesthetics used it may be seen that chloroform, in keeping with its rapid and powerful action, decreased the catalase of the blood most extensively and abruptly; that nitrous oxide, in keeping with its rapid but less powerful action, produced a very abrupt decrease, but not such an extensive one; while ether, in keeping with its more powerful but less rapid action, produced a more extensive but less abrupt decrease than did nitrous oxide; magnesium sulphate decreased the catalase of the blood very slowly, and not very extensively.

It may be that the greater tendency toward acidosis in chloroform narcosis is due to this greater destruction of catalase with resulting decrease in oxidation, and to the greater injury of the liver, the organ in which catalase is formed.

Narcotics of widely different constitution, such as chloroform, ether, nitrous oxide and magnesium sulphate, decrease the catalase of the blood, parallel with the increase in the depth of narcosis.

A very powerful anesthetic, such as chloroform, decreases the catalase more quickly and extensively than does a less powerful anesthetic, such as ether. Slowly acting anesthetics, such as magnesium sulphate, decrease, accordingly, the catalase of the blood more slowly than a quickly acting anesthetic such as nitrous oxide.

As a result of the experiments reported in this paper, and of work done previously on the anesthetics in this laboratory, the theory is advanced that narcosis is primarily due to the decrease in catalase produced by the decreased output from the liver, and by the destruction of catalase by the narcotic, with resulting decrease in oxidation and increase in acidosis.

In relation to anesthesia in general Will Walter observes that it is probable that the sensation of pain is a function becoming or remaining active according to its protective value, and when it fails of manifestations it is either disordered, as for instance in pituitary disease, or of no value because of the enormity of the injury, as by instantaneous severing of a limb; or its needlessness, as in brain or bone injury or in exhaustion states.

Pain is rendered keener by repetition—a cumulative stimulus, as in the field of the special senses—and its experience in and after childhood makes for hyperesthesia throughout life.

Local anesthesia is not suitable for the young because of the pain of the primary injection. The skin is the region producing the most reaction. Nor is infiltration of inflamed areas altogether desirable or very effective.

We have in nitrous-oxide-oxygen the ideal means if some of the existing difficulties may be overcome; and some of the measures evolved to meet them may be best studied by enumerating what they are.

The first difficulty is that it requires too much time to get things ready. Apparatus is complicated, requiring mechanical genius or at least experience to get it going. The second is the need of assistance to coöperate in its administration. The third is the safety element. The fourth is the expense incident to its use.

Analgesia as we define it is a border-line state—*i.e.*, anesthesia just short of unconsciousness without the sensation of pain. "It hurts, but you don't feel it!" The ratio of oxygen to nitrous oxide is the determining factor in this, and hence must be controlled definitely. Over this borderline is where the patient loses control,

fights, resists, or what not, if that is his bent.

We do not now think of analgesia as anything short of anesthesia, and define as hypesthesia those degrees of lowered pain sensation which are short of anesthesia with consciousness. It would seem better to insist upon this distinction, as it is important. There is a stage of relaxation with gas-oxygen adequate for any operation without the deep relaxation which injures. It is aided by preliminary medication with morphine and scopolamine one hour before. While we do not know just what the objective signs are, some day perhaps we shall learn to maintain analgesia with relaxation—genuine anesthesia short of unconsciousness—and then we shall have attained an ideal.

Dr. Ben Morgan, an expert in ether, has made a good point in emphasizing that the athlete who has been completely relaxed and flabby under ether never regains his athletic powers.

The author goes further and states that no adult who is deeply relaxed comes back with the same muscle tonus—commonly called pep—whether this relaxation is from ether, a knock-out in the boxing ring, or from tonus-killing morphine combinations; nor indeed from relaxing types of pyogenic or exhausting diseases. The athlete knows it because he has reason to. He has certain peak loads to carry which he at once finds he can't do. But the every-day fellow finds it out if he watches himself.

As Morgan says, the patient will tell you long after operation, like appendectomy, that he has not been the same since his appendix was removed. The fact is he should date his reversal from the day he was so ether-logged.

With Dr. Morgan's statement, to the effect that a person completely relaxed and flabby under ether never recovers, there will be a wide divergence of opinion. Indeed he will find few supporters in this belief. A further refined method of administering anesthesia is suggested by Guedel, who devised an apparatus to meet a shortage of proper anesthesia apparatus for head surgery in the American Expeditionary Forces, and at the same time provided a suitable device for the administration of the accepted high-volume, low-tension ether vapor for operations about the head and face, by the intrapharyngeal method. The apparatus may be assembled from material that every base hospital has in stock, nor should the assemblage take more than an hour's time. It supplants the high-priced and complicated apparatus now on the market, and can be operated by the novice very much more readily than can the more intricate machines. Because of its auscultatory feature it is particularly valuable in the dark room. The apparatus consists of a dental foot-bellows; a rubber tube, through which air is carried into the ether container (by manipulating the Dakin clamp on this tube the percentage strength of the ether vapor is controlled by regulating the amount of air passing through the ether); a rubber tube through which a stream of air passes to the patient without passing through the ether container (by manipulating the Dakin clamp on this tube, in a direction contrary to that of the inlet tube, the strength of ether vapor delivered to the patient may be further controlled); a rubber tube which carries the mixture of ether and air to the patient (this tube is 4 feet in length, thus enabling the anesthetist to sit well out of the way of the operators); Dakin U-glass distributing tube for the purpose of dividing the air current, between the ether bottle and the patient; Dakin 3-way distributing tube for the purpose of combining the streams of pure air and etherized air, and for the connection of the auscultatory tube.

The auscultatory tube conveys all the information that the anesthetist may need regarding the condition of the patient.

Through this auscultatory tube the anesthetist may determine the following: (*a*) the patient's respiration; (*b*) whether or not the patient is swallowing, or (*c*) the patient's larynx is being flooded with mucus. This complication is rare with the high-volume, low-tension ether vapor method of anesthesia, because the end open-

ings of the nasal tubes, when in position, are just above the larynx and the volume of etherized air is sufficient in most cases to blow all excess mucus into the mouth, from which it is either allowed to drain or is milked out by pressure of the cheek; (*d*) the slightest effort of the patient to cough or vomit, indicating too light anesthesia, a matter that may be immediately remedied by deepening the narcosis; (*e*) the amount of air bubbling through the ether, thus helping to ascertain the strength of the ether vapor. This strength may also be determined by removing the auscultatory tube from the ear and smelling the ether vapor flowing through the tube, as it is always the same percentage strength as that being delivered to the patient.

The author notes that the auscultatory tube furnishes more definite information as to what is going on in the patient's throat and chest than can be had in any other way, not excluding the use of the stethoscope continuously over the chest. In cases in which it is necessary to watch the pulse of the patient, this is easily accomplished at the wrist on the radial artery.

Townsend describes an apparatus for domestic anesthesia, for field ambulance, emergency surgery, and for obstetrical use. It is meant to be as automatic and dosimetric as possible, is simple and compact and ready for use. It can readily be carried in the pocket. It forms a steady vaporization of the anesthetic to the patients and can be automatically said to deliver certain percentage strengths of the anesthetics used. The container holds approximately 100 Cc. of ether, chloroform, or anesthol. Finally Picard describes and pictures an apparatus which he considers the best and simplest device, employing it, however, for chloroform, and holding that the return to consciousness is rapid and complete. Nausea is rare and he bases his conclusions on 500 cases without a fatality.

These articles are of interest as being somewhat characteristic of those which have been appearing for the last sixty years. There must be some best anesthetic agent, or a group of such, and there must be some best way of applying them with variations to suit each individual, and for this it would seem that we should have a united profession. It is not easy to explain why we have not. Perhaps because we have not yet developed a sufficiently large and influential number of skilful anesthetists.

REPORTS ON THERAPEUTIC PROGRESS.

THE "CHRONIC" TONSIL.

WEINBERGER, in the *Pennsylvania Medical Journal* for February, 1919, states that complete removal, except when contraindicated for constitutional reasons, is the procedure of choice regardless of the age of the patient. According to Beck the contraindications are as follows:

1. Acute inflammations or infections.
2. Luetic — particularly ulcerative—processes.
3. Advanced tuberculosis.
4. Advanced cardiovascular changes—that is, in individuals who would be endangered by any sort of surgical procedures, and in all constitutional diseases where the anemia is very marked; for instance, leukemia, pernicious anemia, etc.
5. Advanced cases of diabetes mellitus.
6. Low coagulating power of blood, as in true hemophilia, cholemias, etc.
7. Blood-pressure over 225 systolic.
8. Infants under one year of age.
9. Grave mental disturbances in which marked excitation is present, as in Graves's disease, chorea, etc.
10. Any one that has never had sore throat and is in perfect health, as shown by physical and laboratory examination.

Weinberger states that tonsillectomy has

come to stay. It is the only operation that will survive the test of time and will effectually allay the well-earned criticisms of surgery of the tonsil which often follow the discouraging results or lack of benefit of partial removal (tonsillotomy) and the electrocautery.

Tonsillectomy should be regarded as one

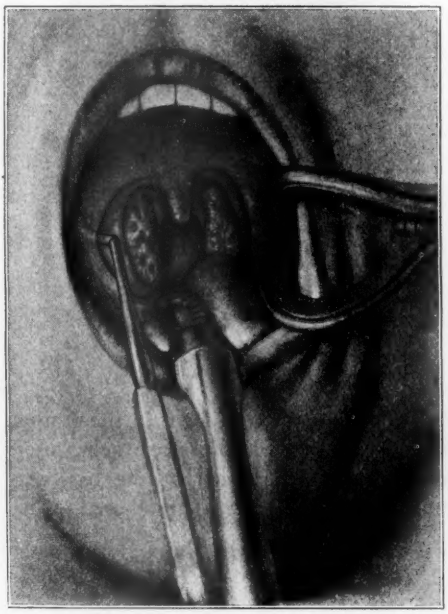

FIG. 1.

of the major operations—performed only in a hospital or the patient's home, and should be done with due regard for the general welfare of the patient as well as the future local condition of the structures about the tonsil. A properly performed tonsillectomy does not disturb the integrity nor the function of the pillars or soft palate, and instead is often beneficial in this regard when such function or integrity has been hampered by repeated and chronic inflammation and adhesions. It is not possible in every case to leave a cosmetically perfect throat, and yet any gross damage to the structures is unnecessary and the result of poor technique, carelessness, and undue haste. Damage to surrounding structures cannot be used as an argument against tonsillectomy any more than the divers theories and groundless fears of supposed remote after-effects, while the vast varied and oft-experienced beneficial results are well-nigh inestimable and incomputable.

Of the various methods of anesthesia and technique in performing tonsillectomy one must choose and develop that which by experience seems best suited, and observe the following points, namely, the shortest time compatible with the least shock and a clean, neat operation. For children the anesthetic of choice is ether, the administration of which is highly important and belongs to the field of the trained and expert anesthetist. When properly administered the operator is not hampered by gagging and coughing. There is far less blood in the field of operation (thus allowing rapid work), the least traumatism to

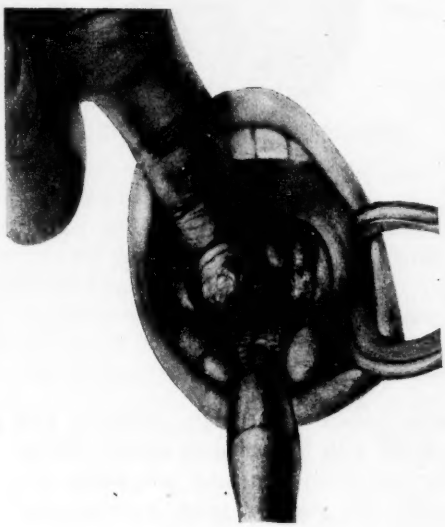

FIG. 2.

the throat, and a clean removal of the tonsils. Because of the abolition of the swallowing and coughing reflex it is important that the patient be placed in a position so that blood and infectious cryptic débris and pus cannot be inhaled. The light on the field of operation should be good.

Leland knives (Eve's modification), right and left in succession, are passed through the mucous membrane as it reflects from the posterior surface of the anterior pillar to the tonsils at the base of the tongue. The incisions are carried upward, hugging the tonsils, and the point of each knife emerges from the triangular fossa opposite the base of the uvula. Both tonsils are shelled from the fossa with the index-finger of the left hand down to the base of their attachment, the only structures still intact with the tonsils being the pos-

FIG. 3.

terior pillars. The right tonsil is now grasped with a tenaculum passed through the loop of an Eve snare and pulled forward. The posterior pillar is shelled free, care being taken not to injure or tear it. The loop of the snare is passed about the tonsil in such a manner as to include the entire lower pole and the attachment is severed. The left tonsil follows in the same manner. In this way the operator is the least hampered by blood.

The patient should not leave the operating room until all bleeding has stopped and should be carefully watched for oozing after returning to bed, particularly during the first twelve hours.

For adults local anesthesia is preferred and advised, excepting in neurotics. The

FIG. 4.

dissection is done as shown in illustration 5, with the scissors, the snare being used to sever the attachment at the base the same as under general anesthesia. The

FIG. 5.

pillars and structures about and beneath the tonsil are freely injected with 1-per-cent novocaine solution containing 3 minims of adrenalin chloride (1:1000) to the drachm.

The injections are extracapsular, and it is important to allow five minutes to elapse in order for the anesthetic to infiltrate the tissues and produce the desired anesthesia.

FIG. 6.

Although mindful of the fact that cocaine, about 1/10-per-cent solution, is more anesthetic to the mucous membrane, Weinberger prefers novocaine because of its comparative freedom from toxic effects. A

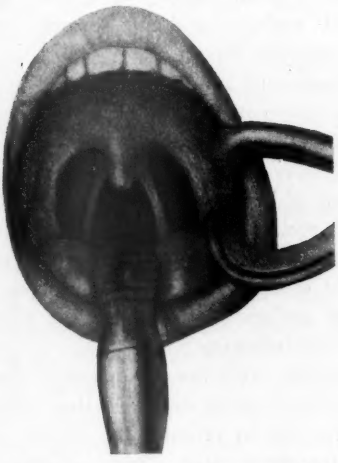

FIG. 7.—Showing end results of operation.

few unfortunate catastrophes have been reported following the use of novocaine. These would bear closer analysis to determine the real cause of accident.

SIGNS OF INTRACRANIAL PRESSURE IN DEMENTIA PRECOX.

HOLMES, HALLOCK, HEADLAND and HART, in the *Alienist and Neurologist* for January, 1919, give their conclusions as follows:

1. The intracranial conditions in dementia precox are those of increased pressure.

2. In some patients in every stage of the disease, the spinal pressure is very high, 160-340 mm. of water.

3. The intravenous injection of 150 Cc. of a 33-per-cent solution of glucose brings down the intraspinal pressure rapidly but temporarily without any change in the mental symptoms.

4. After one patient had recovered and mental and all physical signs of histamin intoxication had disappeared, the intraspinal pressure still remained high.

5. In case of low intraspinal pressure in dementia precox there is some evidence that the spinal pressure and the intracranial pressure may not be the same.

INFLUENZA-PNEUMONIA SERUM.

The *Boston Medical and Surgical Journal* of February 20, 1919, states that the following letter has been issued to members of the profession by the State Department of Health of Massachusetts:

"The committee appointed by Dr. Eugene R. Kelley to investigate the merits of the serum obtained from convalescent influenza-pneumonia patients for the treatment of influenza-pneumonia has reported that it 'believes it is a promising method which should be tried further.' Hospital reports and reports from private physicians strongly indicate that the procedure is of unusual value in the treatment of influenza-pneumonia cases. So convincing is that evidence that the State Department of Health has obtained necessary funds to place trained technicians in various cities where they will demonstrate the methods used for the collection, preservation, and administration of the serum to all doctors who wish to avail themselves of this opportunity.

Should you desire to confer with these physicians write to the State Department of Health and the name and address of our nearest technician will be forwarded to you by return mail.

"The procedure in itself is without harm either to the patient or donor. No bad results are recorded either from withdrawing the blood or in the administration of the serum.

"To achieve the best results in the use of this serum it must be given early and to properly selected cases.

"Your coöperation in this matter is earnestly solicited."

The procedure which technicians should follow is outlined in a circular accompanying this communication:

PROCEDURE FOR TECHNICIANS TO FOLLOW.

I. Selection of Donors.

A. Donors must be known convalescents from influenza-pneumonia. This is indicated by history sheets showing—

(*a*) Temperature—fever for more than four days.

(*b*) Leucocyte count—not over 10,000.

(*c*) History of physical findings.

B. A Wassermann test must be done and must be undoubtedly negative.

C. Donors must have completed at least 10 days of convalescence with a normal temperature and not have exceeded 30 days from beginning of convalescence.

II. Selection of Patients.

A. Serum should not be given to any patient who has not developed influenza-pneumonia.

B. To be most efficacious, the serum must be given early. It is practically useless in late or moribund cases.

C. No serum should be given unless the patient will agree to furnish some blood in return for that given.

D. No serum should be given to those patients presenting a white count of over 10,000 or having a fixed type of pneumococcic sputum.

III. Collection of Blood from Patients.

A. Sufficient blood for a Wassermann test should be taken at the time of administration from each case receiving serum. This specimen should be sent for examination at once.

B. Blood should not be taken before the tenth day of convalescence. Not over 500 cubic centimeters should be taken at one time.

C. The patient should not be bled more than twice, and at least 48 hours should elapse between bleedings.

IV. Procedure for Preparing Blood.

To be shown at demonstration.

V. Procedure for Administering the Serum.

To be shown at demonstration.

DRUGS USED BY ADDICTS.

BLOEDORN, in the *Journal of the American Medical Association* of January 25, 1919, states that heroin appears to be the drug most easily obtained at present; as a result the great majority of addicts are heroin users. Also, heroin admits of easy adulteration, requires no apparatus to take, and can be readily distributed. While heroin occupies a place of some importance in the equipment of the physician, it is by no means indispensable, and it could be discarded entirely without serious results. [We question this?]

Cocaine and morphine are used by only a small percentage of addicts. The effects of cocaine are rather violent, and the addict will usually state that he lost no time in shifting to heroin as soon as he could get it. He realizes that cocaine is a much more dangerous drug and requires much greater care in dosage. Its effects are more frequently noticeable, and he is more liable to discovery following its use.

Morphine from the standpoint of the addict is much more desirable than cocaine. It is not apt to produce the violent reactions frequently seen after a slight overdose of cocaine, and the mental effect appears to be better.

However, the ideal drug for the addict seems to be heroin, and we would do well to pay particular attention to this narcotic.

It does not follow that if the manufacture of this drug were stopped entirely we should have the majority of addicts under control; but we should have greatly decreased the availability of habit-forming drugs and should have removed one of the worst offenders among the narcotics.

Opium and its derivatives, ever since their action was known to man, have been the great narcotics on which the individual who feels himself inadequate to face life squarely has rested and drifted with the tide. If we dispose of heroin, it is probably from among these derivatives that substitutes will be sought.

INFLUENZA.

The *Journal of Laryngology, Rhinology and Otology* for December, 1918, in an editorial states that although much of the newspaper clamor during the present influenza epidemic is to be strongly deprecated, nevertheless we may, on the whole, welcome it as an indication of the lively interest taken nowadays in matters of public health. And, indeed, it is not difficult to discern in these excursions and alarums of the press the forging of an implement whereby the long-delayed Ministry of Health may at length be erected.

With the wider questions raised by the epidemic we as specialists may have little to do, but it is impossible not to ask ourselves what element it is in their nature or in their human soil that confers upon certain contagious diseases the occasional propensity to travel far and wide—a propensity often suddenly manifested, and acquired it would seem in one particular locality. The present wave radiates from Spain; the epidemic of 1889-90 came from Russia.

The notion that influenza spreads on the winds is as old as the human race, but it is a fact that even influenza, the fleetest of all epidemics, can invariably be traced to immediate human contact.

Thus the spread of the disease must obviously lie within our control, if only we knew how to exercise it. And if the first cases of an epidemic could be diagnosed and isolated much illness and loss of life would be prevented.

Unfortunately, it is impossible to recognize influenza the epidemic disease, as such, in the hour of its birth, and even to-day, with all their experience, bacteriologists are speaking in very uncertain tones regarding the morbid agent. Pfeiffer's bacillus may be—probably it is—the cause, but then Pfeiffer's bacillus is found when there is no epidemic, in sporadic cases which remain sporadic. What it is exactly that at one time gives to the bacillus its spreading quality and at another time withholds it is at the present moment unknown to us; and until it is known efforts at isolation must fail, since we are unable to determine when a sporadic case or group of cases is likely to originate a wide-spread and serious epidemic.

For individual protection during the epidemic the use of the surgeon's face-mask or veil both by the patient and by his attendants obviously suggests itself as a protection against the spraying of the neighborhood with droplets of infected saliva, and in the second place dishes and other utensils soiled by the patient should be sterilized regularly and all discharges burned. But we do not recommend "sniffing" salt water up the nose as an influential medical corporation has recently done.

Each epidemic wave of disease has certain characters that distinguish it from other epidemics of the same disease. Many observers must be able to recall influenza epidemics in which cases of serious osseous destruction in and about the middle ear were very prevalent. At the present time this grave complication seems to be less common, but we are meeting, on the other hand, with a large number of cases of pharyngeal inflammation, amounting often to cellulitis of the peritonsillar and retropharyngeal regions, sometimes simulating diphtheria, sometimes resembling the more severe scarlatinal throat. Abscess-formation is not uncommon, and there is always great swelling around and enlargement of

the cervical glands, with such constitutional phenomena as high fever and delirium. This type of the disease is tedious and depressing to the general health and resistance, but it tends to recovery in most of the cases in about ten days from the onset.

TREATMENT OF DANGEROUS HEMATEMESIS.

BASTEDO, in the *American Journal of the Medical Sciences* for January, 1919, summarizes his article as follows: (1) To stop the bleeding. (2) To overcome its effects. (3) To prevent its recurrence.

The treatment is:

1. Have patient very quiet, lying down, with head low, with a light ice-bag over the stomach, and with plenty of fresh air.

2. Avoid unnecessary manipulation.

3. Give a hypodermic of morphine sulphate, 0.015 gramme (gr. ¼), with strychnine sulphate 0.002 to 0.003 gramme (gr. 1/30 to 1/20).

4. Immediately after vomiting give by mouth a solution of thromboplastin, kephalin, coagulen, or adrenalin.

5. In a case not of the portal congestion type, if the stomach remains distended and the bleeding seems to persist, lavage with tepid water, and follow this by passing in a solution of adrenalin, thromboplastin, kephalin, or coagulen through the tube. In portal congestion cases avoid lavage.

6. Prepare early for transfusion, and as soon as there are indications for it transfuse with careful watchfulness.

7. If there is severe exsanguination, bandage legs and arms, raise the foot of the bed, bandage and put weights on the abdomen, keep up body warmth, and furnish fluid intravenously, subcutaneously, and by rectum.

8. If transfusion cannot be done give intravenously Locke's or Ringer's solution containing 5 per cent of acacia.

9. Finally, have a surgeon at hand to share the responsibility, but do not operate.

To prevent recurrence inject subcutaneously every six to twelve hours, for one or two days, 10 to 50 Cc. of human, rabbit, or horse serum, or a solution of coagulose or euglobulin, or a single dose of 100 to 500 Cc. of human serum; or inject intramuscularly a solution of coagulen, thromboplastin, or kephalin.

If recurrence happens, resort to surgery, if necessary, preceding the operation by transfusion, (*a*) after the bleeding has stopped, or (*b*) if the bleeding continues but has become persistently small in amount.

DELAY IN THE TREATMENT OF CANCER.

FARR, in the *American Journal of the Medical Sciences* for January, 1919, states that the data so far obtained are too meager for definite conclusions, but it is obvious that in the average case a considerable period of time is lost between the onset of symptoms and the first visit to a physician, that the physician's advice is wrong in considerably more than half the cases, and finally a much longer period after the first consultation is wasted before the patient enters the hospital.

The data in the incurable cases would seem to bear out the ill results of the physician's wrong advice. Practically 50 per cent came too late for a cure, and of these two-thirds had been poorly advised by their physicians.

The causes for delay in seeking surgical help are not far to seek—ignorance and fear on the part of the patient, possibly fear of losing a patient on the part of the physician. An ill-founded and careless optimism costs many lives undoubtedly. In extenuation it may be said that the average physician sees not more than one case of cancer a year, judging from the latest and best statistics available. It is too much to expect him to be able to make refined diagnoses under the circumstances, but he should be taught, and so should the laity, that every "lump" may be the seed or beginning of a cancer, and that an early slight operation offers far better prospects than a late severe one.

SHOCK AND ACIDOSIS.

The *British Medical Journal* of December 14, 1918, mentions several previous occasions when it referred to the work of the special Investigation Committee on Surgical Shock of the Medical Research Committee. Another report has now been issued, dealing with the relation of acidosis to the symptoms of shock. It is of the greater value because it expresses the conclusions reached by a committee of physiologists and surgeons after a great deal of many-sided experimental work as to the relation of acidosis to shock, and as to the nature of shock. There has been during the past year or two so much discussion, and so many divergent views have been strongly expressed, that the coming together of the chief workers in the conclusions now given by unanimous agreement in this report has special interest.

The position of the subject when it was taken up by the Committee was obscure. There were two main currents of opinion, of which one attached chief importance to the term "acidosis," used to denote a reduction of the alkali reserve, or, more simply stated, of the sodium bicarbonate of the blood plasma. Cannon, from observations made at a casualty clearing station in France by van Slyke's method, had found that there was a notable deficiency of alkali reserve in the blood of patients suffering from shock, and that its extent showed a general correspondence with the severity of the condition, so that it could be used as an index to the fitness of the subject for operation.

The investigations of the Committee now reported were directed to ascertain the true significance of this acidosis, the existence of which in shock was beyond question. It was common ground that defective circulation would cause acidosis, and one type of defect—that due to hemorrhage—had been shown by Milroy to have that result. But beyond this the Committee was confronted with the two alternative opinions: the first was that primary acidosis resulted in some way from the trauma, and that it developed in advance of, and had at least an important share in, the causation of the circulatory failure. On this head there was some evidence indicating that lactic acid, evolved by injured and moribund muscle as it passed into rigor mortis, was the cause of this acidosis. Those who abided by this first alternative recognized that a secondary acidosis would develop from the consequent failure of the circulation, but they maintained that the initial disturbance of the equilibrium starting the train of symptoms was attributable to primary acidosis caused by the trauma. Those who held to the other alternative did not concede the central importance of a mere reduction of the alkali reserve in the blood, which they regarded as a symptom and a measure of the defective oxidation due to the sluggish flow of blood through the capillaries. They refused to admit that there was any evidence that acidosis of the degree recorded in the cases was in itself harmful, or, indeed, that a much more extreme depletion of the alkali reserve would initiate a failure of the circulation of the type under discussion. They maintained, therefore, that the cause of this circulatory defect must be sought elsewhere.

This difference of opinion was not of mere theoretical interest; it involved practical questions of treatment. Were acidosis the primary event, and failure of the circulation secondary, the obvious treatment for shock would be to restore the alkali reserve in the blood by giving sodium bicarbonate, and it might even be hoped to prevent shock by giving bicarbonate to the wounded before shock had had time to develop. On this view restoration of the volume and rate of the circulation by other means would be merely palliative and symptomatic treatment, for unless the alkali reserve were directly restored the root of the mischief would remain. On the other hand, were the acidosis merely a consequence of the weakened circulation, as was held by the opponents of this view, injection of bicarbonate solutions would have little, if any, more value than that of equivalent in-

jections of neutral saline. Radical relief could only be expected from measures which restored to the blood its normal value and rate of circulation. If this could be effected by transfusion of blood or infusion of some efficient substitute such as a solution of gum in saline, renewal of efficient oxidation in the tissues would insure the disappearance of the acidosis.

Experimental observations on animals led at first to contradictory results, but eventually the two groups of observers combined in a test from which the possible complicating factors were eliminated; the result was the unanimous conclusion that acidosis does not by itself cause shock or any comparable impairment of the circulation. The experiments were mainly directed to the condition of the circulation; the central feature of the form of shock specially investigated was progressive deficiency of the circulation, due to inadequate venous return to the heart with consequent slowing and partial stagnation at the periphery.

The Committee's conclusion, therefore, is negative; but it is nevertheless of great practical importance, inasmuch as it excludes the hypothesis that shock is caused by acidosis. The parts played in its genesis by nervous, chemical, or other influences are left for further investigation. It is recognized, moreover, that possibly several different conditions may be included in the rather vague use of the term "shock" now prevalent, and that in some of these the central feature may be depression of vital functions other than that of the circulation.

The whole effect of the evidence obtained in the investigation has been to emphasize the cardinal importance of maintaining an adequate oxygen supply to the tissues and to show that the most potent agent in rendering the supply inadequate is defective circulation through the capillaries. The practical conclusion, therefore, is that restoration of the volume of blood in effective circulation is the object to be aimed at, for then acidosis will disappear naturally. Transfusion of whole blood is said to be probably the measure most likely to be successful in procuring this restoration in the largest proportion of cases, provided it is applied without undue delay. When, however, delay has unavoidably occurred it is to be remembered that low blood-pressure and retarded capillary circulation are much more harmful than a reduced oxygen-carrying power of efficiently circulating blood. In a large proportion of cases infusion of gum saline solution will be almost as effective as transfusion of blood, and in a further proportion it will be effective in deferring the appearance of the secondary results of impaired oxidation in the tissues, so that transfusion of blood, if it later becomes necessary, can be undertaken with a greater prospect of success. The fluid recommended for infusion is a filtered and sterilized solution of 6-per-cent gum acacia in 0.9-per-cent sodium chloride. It is now being prepared in bulk at a base hygiene laboratory. If symptoms such as "air hunger" appear to indicate that acidosis has become a source of danger, sodium carbonate may be given separately by the mouth or rectum, or, if necessary, by cautious intravenous injection of a 2-per-cent solution, which is approximately isotonic.

THE TREATMENT OF EPIDEMIC PNEUMONITIS.

STINE, in the *Journal of the Missouri State Medical Association* of January, 1919, recommends absolute rest in bed of all cases, as even the mildest is a potential pneumonia. The wards should be kept warm and patients protected from draughts. There is no attempt to control fever by hydrotherapeutic measures.

On entering the patient is given Dover's powder, two and a half to five grains, and quinine, two and a half to five grains, repeated every four hours. Medication by mouth is often discontinued on account of nausea. On the appearance of signs of consolidation—that is, areas of bronchial breathing and dulness—camphor, 36 grains, in sterile olive oil was given intramuscularly every eight hours in men and every

ten hours in women. In the severe types of pneumonia this dose was given as often as every four hours for four doses and then every eight hours. Some patients received as much as 800 grains in seven days. Since October 10, 1918, in the severer cases that did not respond to the camphor, a transfusion of citrated blood from convalescent patients has been done. The results of this procedure were somewhat doubtful. Normal horse serum seemed to give a beneficial result in about the same percentage of cases.

The Robinson method of blood infusion as modified by Dr. Addison Gulick of the University was used. The modification consists of the addition of thermometer, moving inlet to base of bottle, and shortening inlet tube. There is also a pressure indicator.

Forty-five Cc. of 3.8-per-cent sodium citrate (isotonic to blood) is placed in bottle and 200 Cc. of blood is added from donor.

In injecting blood one should proceed slowly, watching the indicator for signs of too much pressure. Dog experiments have shown that as small an amount as 50 Cc. injected rapidly can kill a 30-pound dog.

Forty-five Cc. of sodium citrate would slightly increase the time it takes the blood of a patient to coagulate, so when 120 Cc. was injected intravenously into a 30-pound dog clotting time was increased two to three times (dog blood clots rapidly).

Sodium citrate action on clotting is probably due to suppression of the ionization of calcium, as calcium is a heart stimulant. Sodium citrate would theoretically act as a depressant, but dog experiments do not bear this out.

Intravenous infusions of solutions of alkaline salts were without results. The results of the treatment of the infection with a vaccine made from killed diplostreptococci are doubtful.

Immunity.—The disease does not bestow a lasting immunity on all individuals. Relapses are common.

Stine concludes that the terms influenza and complicating pneumonia are misleading. The disease is a pneumonitis that is highly contagious. His low mortality, 1.3 per cent, he explains as resulting from the early recognition of the extension of the pneumonitis in the alveolar tissue of the lungs, keeping the temperature of the wards at about 75 degrees, and to the use of large doses of camphor in those cases in which pneumonia was suspected.

Blood transfusions gave doubtful results, probably due to the very slight immunity possessed by the convalescent patient. Alkaline medication is useless except where a long sickness or stormy convalescence has occasioned considerable wasting. The bacterial invader causing the disease is a small diplostreptococcus. Vaccines made from this organism may immunize the healthy individual.

THE MEDICAL TREATMENT OF CANCER.

BULKLEY, in the *New York Medical Journal* of January 11, 1919, states that the medical treatment of cancer is a hard subject to speak briefly about. As already intimated, there is no specific for cancer and probably never will be. Each case has to be studied most carefully, even week by week, and during prolonged treatment very many remedies may be needed to meet the various requirements, in order to make the metabolism correct and to keep it so. To aid in this a constant and careful study of the urine is necessary. This relates to the total daily output, securing an efficient elimination of solids in proportion to the body weight, the actual volumetric acidity, the organic and mineral ingredients, etc., which have been presented in his writings. For this, repeated and complete volumetric analyses are necessary. The importance of these methods can hardly be overestimated. Much care must also be exercised in securing a full and satisfactory intestinal elimination, which is to be assiduously cared for and not left to the patient's discretion or treated in a routine or careless manner.

There are many minor items in regard to the care of these patients which cannot be entered upon now, and have been treated of elsewhere, but it can only be stated that attention to the smallest details of life is essential to securing the best results in the plan of treatment under consideration.

It was stated, a while ago, that there was no specific for cancer and probably there would never be, but there is one remedy which has so continually proved of inestimable value that it should be mentioned. That is one of the salts of potassium, as has been long used by him, and more lately confirmed by several observers. This should never be neglected in handling these cases, and may be administered over long periods with advantage, alternated perhaps with various tonics from time to time. The salt he prefers, and has used for forty and more years, is the acetate of potassium, in doses of from fifteen to thirty grains, generally combined with nux vomica and fluid extract of rumex root, given three times daily, half an hour before meals, well diluted. Fluid extract of cascara is commonly added, in doses sufficient to secure full and free daily action of the bowels. Iron and phosphatic preparations are also called for in most cases, even over long periods, and very many other remedies may be needed from time to time to render the metabolism correct. Morphine is very commonly given to cancer patients, even soon after they have begun to experience pain, but this is very undesirable, as it interferes seriously with the action of the internal organs, and lessens the chance of recovery. In many cases he has found relief from aspirin, given every two hours. This not only diminishes the neuritic symptoms, but even helps in the treatment by rectifying the rheumatic element which is often a feature in cancer. In looking over his histories of cases he finds that practically no morphine has been taken even in recurrence after operations and those that have ended fatally.

He does not burden his article with statistics showing the advantages of the medical treatment of cancer, as already outlined, nor with histories of cases. In his long experience there is absolutely no comparison between the results thus obtained and those claimed by surgeons. In dozens of patients he has seen breast tumors which had been diagnosed as cancer, often by several competent surgeons, in whom the tumor has entirely disappeared and then remained absent, when the patient had been faithful to treatment long enough. Some of the cases which he has reported date back thirty years and more, for some of whom operations had been arranged for by surgeons, and a number of them he has watched for ten to sixteen years and they have remained entirely well. He has reported two cases of uterine cancer, which had been refused operation by several surgeons, and had been proven microscopically to be very malignant, which have been perfectly well for over two years, as testified to by the examination of others. A patient with a cancer of the bladder, treated also by fulguration, has remained well over two years, and one with cancer of the prostate improved marvelously, but was lost sight of. In two cases of cancer of the stomach, so diagnosed by others, the trouble seems to have disappeared.

[We wish we could believe in these results, but we fear that the general adoption of these views will result in many disasters. —ED.]

THE CLIMATIC ILLUSION IN THE TREATMENT OF TUBERCULOSIS.

CRUTCHER, in the *Medical Record* of January 11, 1919, states, as to a change of climate, that it must be determined by cautious individual analysis. That any particular region or climate is better suited than any other region or climate to a preponderance of the human family on account of any pathological condition is the utmost folly. For a person in settled business in the East to break up all ties and fly to some desolate, ill-kept boarding-house located in some far-away desert, under the pathetic illusion that isolation is a panacea for disease, is such

pitiable nonsense that the wonder is that any rational being should be guilty of it. In countless instances the ability to earn bread is fully as important as the power to digest it. Those dependent upon their labor from day to day for the means of living must not suppose that the impossible can be accomplished more readily in one region of country than in another. Nor must unbounded confidence be placed in the highly colored and too frequently misleading reports that emanate from purely interested sources.

The most preposterous absurdities are frequently sent forth by honest but misguided persons who mistake illusions for realities. Many things pleasing to the eye and profitable to the mind bear no relation whatever to the cure of disease. A charming landscape is no substitute for wholesome food, comfortable surroundings, and skilled medical supervision. There is no more a specific for tuberculosis than there is for poverty and old age; and so far as climate alone is concerned it has no more curative effect in this condition than it has in gall-stones or cancer. [With this last view our experience concurs.—Ed.]

PROGNOSIS IN HEART DISEASE IN RELATION TO AURICULAR FIBRILLATION AND ALTERNATION OF THE PULSE.

White, in the *American Journal of the Medical Sciences* for January, 1919, states his summary as follows:

1. Three groups of 100 patients each, showing (1) pulsus alternans, (2) auricular fibrillation, and (3) normal rhythm, have been studied with relation particularly to prognosis. A large number of each group has been followed for two or three years and the condition determined at the end of that time.

2. Seventy-four per cent of the cases with pulsus alternans, 48 per cent of the cases with auricular fibrillation, and 47 per cent of the cases with normal rhythm, have died.

3. The higher grades of alternation of the pulse carry with them an especially high mortality, nearly 100 per cent, within three years.

4. The cases with auricular fibrillation complicated by aberrant ventricular complexes seem to be very fatal (100 per cent in the present series), those cases with ectopic ventricular contractions complicating the fibrillation have a mortality almost as high as the total of alternation, while uncomplicated auricular fibrillation has a surprisingly low mortality percentage.

A MODERN ASPECT OF THE TREATMENT OF ULCUS VENTRICULI.

Held and Gross, in the *American Journal of the Medical Sciences* for January, 1919, state that in cases of hyperacidity, when the clinical diagnosis points to an appendix or gall-bladder, the removal of the diseased organs leads, in a great majority of cases, to a complete cure and prevents the formation of an ulcer.

Functional constipation causing hyperacidity must be treated appropriately in order to prevent ulcer formation. Dietetic régime is the most valuable item in the treatment. The food should be non-irritating, but still bulky. Cereals well prepared (excluding rice and barley); vegetables in purée form partaken of in large quantities; fats in the form of cream, butter, and olive oil, 1 tablespoonful 3 t. d. before meals, are very efficacious. Meats should be taken in small quantities, not fried or seasoned, so as not to excite excessive secretion. Fruits like baked apples or apple-sauce or fruit jellies, later peeled ripe apples, cherries, pears, and plums, are allowed. Because of the tendency to gastric irritation and the predominance of the descending type (spastic) of constipation it is best to avoid eating berries, because of the seeds they contain, until the gastric symptoms and objective signs of spastic constipation disappear.

As to medication, belladonna is doubly valuable, because it serves as an antacid and antispasmodic. It may be given either in powder form, as the extract, 0.01, 3 t. d.,

one-half hour after meals, or in suppositories 0.02, 2 t. d. Olive oil enemata, 8 ounces, to be retained over night, for one week every night and then every other night to the end of one month, and then once a week for another month; and finally an oil enema at night when one or two previous days show constipated movements. The evacuation of the oil, even with a satisfactory movement, should be followed by a small soap-suds or saline enema, in order to wash away the oil from the colon, thereby avoiding the irritation that may result from the fatty acids formed. Some patients are irritated by the pure oil; to avoid this the oil can be prepared with a teaspoonful of sodium bicarbonate in the form of an emulsion.

The treatment outlined, if conscientiously carried out, brings about gratifying results, so that the symptoms of hyperacidity and constipation may disappear forever. The patient is advised that the first recurrence of the symptoms will necessitate a repetition of the treatment.

EFFECT OF INFLUENZA ON THE HEART.

SALZMAN, in the *Journal of the American Medical Association* of January 4, 1919, states that many physicians no doubt have frequently seen cases of influenza in which, usually after the fever has subsided, the pulse is slow and easily compressed, and the patient complains of dizziness, extreme weakness and depression, and on attempting to get up often falls in a faint.

Examination usually reveals a slow heart with sounds somewhat muffled, giving the impression to the ear of a tired-out heart. This condition is usually taken to be one of myocarditis, and frequently it has been stated that in the future we shall have a great many cases of myocarditis and other heart conditions to contend with.

In taking the blood-pressure, he has found invariably the diastolic pressure perfectly normal. The systolic is usually very low, so that the pulse-pressure is anywhere from 15 to 20. This condition he has seen about once in every twenty or twenty-five cases of influenza under his care, and it has appeared in cases showing the very mildest or slightest degree of infection, as well as in the severer types. The fact that it appears in the mildest type of infection, in which the fever is very low and lasts only three or four days, as well as in the severer types, would lead him to believe that it is not due to an infection of the heart muscle itself, but rather to some disturbance in the factors that control the blood-pressure.

It has been pointed out that severe infections, including influenza, frequently produce a disturbance of the suprarenal gland. For this reason Salzman has used in all these cases the suprarenal gland or its extract, giving usually ten drops of the 1:1000 solution under the tongue every three hours. Within twenty-four hours there is usually a very decided change in the clinical condition of the patient. The dizziness and the extreme depression are gone, and the pulse-rate increases from 10 to 15 beats per minute, the pulse-pressure also increases, and within a few days the patient is comparatively well.

He does not mean to imply that myocardial or endocardial lesions do not occur, as they undoubtedly do in any such severe infection as influenza. However, he does feel that the majority of the heart manifestations we encounter are of the type described above.

THE CAUSE AND PREVENTION OF SCURVY.

In view of the fact that outbreaks of scurvy have occurred at various times, both in Great Britain and abroad in His Majesty's Forces, and in order to guard against a recurrence of such outbreaks, especially at places far removed from sources of supply, the Royal Society Food (War) Committee has thought it advisable to issue the following statement, based chiefly upon investigations carried out at the Lister Institute:

1. Scurvy, like beriberi, is a "deficiency disease," and is due to the long-continued consumption of food lacking in an accessory food substance or vitamine. The view that scurvy is due to tainted food must be abandoned.

2. This vitamine is contained in a number of fresh foods: in largest amount in oranges, lemons, and fresh green vegetables; in considerable amount in roots and tubers, such as swedes, potatoes, etc.; and in small quantities in fresh meat and milk. It is deficient in all dried and preserved foods.

3. It is destroyed by prolonged heating, such as takes place during stewing. Thus potatoes in stews would be devoid of vitamine, but if boiled rapidly will still contain some quantity. Alkalies rapidly destroy antiscorbutic properties. Soda should therefore not be added to the water in which vegetables are soaked or boiled.

4. Before the onset of definite symptoms of scurvy there is a period of debility and weakened resistance to disease. The occurrence of cases of debility in any body of troops without sufficient cause should at once direct the medical officer's attention to the sufficiency of the diet.

5. West Indian lime-juice, as ordinarily prepared, is useless for the prevention of scurvy. Fresh limes have an antiscorbutic action, but their efficiency is only one-fourth that of lemons. The so-called "lime-juice," by the regular administration of which scurvy was eliminated from the navy during the first half of the nineteenth century, was really lemon-juice obtained from the Mediterranean. The history of Arctic exploration affords numerous examples in which scurvy was prevented for long periods of time by the agency of lemon-juice regularly taken. Nares's expedition of 1875, notorious for the serious outbreaks of scurvy encountered, was the first to be provisioned with "lime-juice" prepared from West Indian limes. Orange-juice is as effective as lemon-juice.

6. Potatoes and root vegetables have a distinct value in the prevention of scurvy—much less, however, than green vegetables or fresh fruit juices. A daily ration of 14 ounces of potatoes, boiled rapidly but not stewed, will suffice to prevent scurvy.

7. Pulse, beans, peas, and lentils in the dried condition have no antiscorbutic properties. If, however, the dried seeds are soaked in water and are allowed to germinate for a short period, one or two days, they develop the antiscorbutic vitamine. At the same time these pulses are also rich in the vitamine which prevents beriberi, and are, moreover, valuable foods.

The method adopted for germination is as follows: The beans, peas, or lentils are soaked in water at room temperature (60° F.) for twenty-four hours. The water is then drained away, and, to permit germination, the soaked seeds are spread out in layers, not exceeding 2 to 3 inches in depth, and kept moist for a period of about forty-eight hours at ordinary room temperature (60° F.). They should not be allowed to dry after this operation, but should be cooked as rapidly as possible (lentils, 20 minutes; peas, 40 to 60 minutes).

8. The antiscorbutic value of fresh meat is very low in comparison with that of fresh vegetables and fruit. If fresh meat is consumed in large quantities, 2 to 4 pounds a day, scurvy will be prevented. Tinned and preserved meats possess no antiscorbutic value. Frozen meat, while more valuable than preserved meat, must be considered inferior to freshly killed meat in this respect.

9. The destruction of the antiscorbutic properties depends rather upon the time than the temperature employed. All foods, especially vegetables, should be cooked for as short a time as possible at boiling point. Slow methods of cooking, such as stewing with meat or simmering below boiling point, should be avoided. Potatoes should be plunged into boiling water and the boiling continued for twenty to thirty minutes after the boiling-point has again been reached. Frozen meat should be roasted when practicable.

The following is a summary of measures

recommended for the prevention of scurvy when fresh vegetables are unobtainable:

(*a*) The lime-juice ration should be replaced by lemon-juice. The ration should be 1 ounce daily served with sugar.

(*b*) Cooked germinated peas, beans, or lentils should form part of the regular daily ration.

(*c*) Attention should be paid to the methods of cooking employed, as set forth under 9.—*British Medical Journal*, November 30, 1918.

CAMPHOR IN ACUTE INFLUENZAL BRONCHITIS AND BRONCHO-PNEUMONIA.

GIUSEPPI, in the *British Medical Journal* of December 28, 1918, calls attention to the recent outbreak of influenza at Felixstowe. He treated 250 cases with camphor, with a mortality of one—a man who died after three days' illness from bronchopneumonia.

The incidence of bronchopneumonia in the 250 cases was 26, or 10 per cent; in another series of 200 cases during the same outbreak, and untreated with camphor, the incidence was 8 per cent, but the number of deaths was 4, a mortality of 2 per cent. The outbreak was very severe, and the cases treated ranged in severity from very acute to mild. The temperature varied from 105.5° to 100° F.

The treatment adopted was the administration of pills containing four grains of camphor made up with soap, in mild cases three times daily and in the very acute cases every three hours. The treatment was continued until the temperature dropped and the signs of bronchitis or bronchopneumonia cleared up. A typical case may be of interest.

A boy, aged ten, was suddenly taken ill on September 6 with acute pains in the back and head. When seen the temperature was 105.6° F., pulse 120. There was slight cyanosis, and marked and wide-spread signs of bronchitis and patches of bronchopneumonia were found over both lungs. On September 7 the boy became unconscious. The camphor pills were begun on September 8, after the unconsciousness had lasted thirty-six hours. Pulse 130, temperature 104.8° F. Within twenty-four hours the boy recovered consciousness. The signs in the lungs slowly cleared up, and the chest became normal on September 12.

There was no doubt in the minds of those who watched the boy that his recovery was entirely due to the camphor. The only other treatment was a diaphoretic mixture, which was stopped on September 9.

The effect of camphor in large doses is very marked, and though the number of cases treated is too small to allow Giuseppi to describe it as a specific, he thinks there can be no doubt, from the difference in the mortality in the two series of cases treated during the same outbreak with and without camphor, that the curative action of camphor is remarkable. Certainly its effect in clearing up the lungs and lowering the temperature far surpasses that of any other drug that has been tried by this writer.

MENINGITIS.

ROYSTER and MCDOWELL, in the *Journal of the American Medical Association* of January 11, 1919, give their clinical observations as follows:

1. They treated only the patients under fifteen years of age, but observed many of the others.

2. Intensive treatment should be conducted early.

3. Since the disease probably starts as a bacteremia, they think it advisable, at least in the early stages, to use serum intravenously as well as intraspinally.

4. Patients that are not well clinically after seven days' treatment rarely recover ultimately.

5. It is rarely necessary to give as much serum in the spine as the fluid withdrawn, 30 Cc. being a good average adult dose, and 15 Cc. a good child's dose.

6. Prolonged serum treatment frequently keeps the temperature raised without doing good.

TREATMENT OF SCABIES AT AN EMBARKATION HOSPITAL, CAMP STUART, NEWPORT NEWS, VA.

LANE, in the *Military Surgeon* for January, 1919, states that the treatment can be covered best in two sections, the actual medical treatment and the prophylaxis so called for the want of a better name. The individual starts his treatment the first night with a vigorous scrub with brush and soap under the shower, with instructions to "get the tops off" as many lesions as possible. Thoroughness in this part of the treatment is stimulated by telling the man that the better he does his part the sooner he will be discharged from the hospital. Following the bath, each man rubs in the ointment thoroughly over the entire body below the chin, paying special attention to the hands, axillæ, and genitals. The ointment which has been used exclusively at this hospital is the official sulphur ointment, both alone and with the addition of balsam of Peru (4.0-8.0 gm. to 30.0 gm. of the ointment). A bath is taken the next morning with a complete change of pajamas and bed linen, and a lighter application of the ointment is made, to remain on during the day. This treatment is repeated each day during the stay in the ward.

The preventive treatment is undertaken with the idea of prevention of reinfection in the individual and the prevention of the spread of the disease to others. In the first place, the clothes of each man, after being checked up, are sent to the hospital sterilizer and then to the laundry, before being checked in at the property room ready for the patient. All blankets, as well as the bed linen and towels, are sent to the sterilizer for treatment at the time when the soldier is discharged from the ward.

Every case of scabies admitted to the ward has been reported promptly through regular channels by name, rank and organization to the organization commander in order that the individual's blankets can be sterilized before his return to the company, and to prevent their use by others until such sterilization is accomplished. In addition, each patient before leaving the ward is instructed to see that his extra underclothes, towels and stockings in his barracks are boiled before being used again, and if necessary to sleep in his present clothes till this is done.

THE IMPORTANCE OF BLOOD-PRESSURE OBSERVATIONS IN SURGICAL PROGNOSIS.

MILLER, in the *Boston Medical and Surgical Journal* of January 2, 1919, states that Moots has formulated a rule for determining the resistance of patients by preoperative blood-pressure tests. The rule is as follows: A case has a systolic pressure of 120 and a diastolic pressure of 80; the pulse pressure is 40 and the ratio of pulse pressure to diastolic is 40 to 80, or one-half, which means 50 per cent of the diastolic pressure. This pressure ratio is really an important matter, as it represents the relationship existing between the kinetic energy expended by the cardiac contraction in moving the blood column and the potential energy stored in the arterial walls and column of blood which they contain. If the pressure ratio is high or low, there is reason to apprehend danger. If the pressure ratio lies between 25 per cent and 75 per cent, the case is probably operable; if outside these limits, it is probably inoperable.

To determine the accuracy of this rule, the series of 1000 cases referred to has been checked up with the rule in mind. Of the operable cases, according to Moots's rule, 3.23 per cent died and 96.77 per cent recovered. Of the inoperable cases, 23.07 per cent died and 76.93 per cent recovered. Some of the cases classed as inoperable underwent minor operations safely, and some of those classed as operable died after very serious operations and under circumstances which could not have been readily predicted. The result shows the great value of Moots's rule in surgical prognosis.

Miller also states that McKesson has formulated a rule for measuring the sever-

ity of shock during operation. He holds that "a typical case of shock is characterized by a diastolic pressure of 80 millimeters or less, a pulse pressure of 20 or less, and a pulse rate of 120 or more," and states that "after a half-hour of sustained low pressure and rapid pulse has been passed, almost every patient succumbs either shortly or within three days of surgical shock and heart exhaustion."

The series of 1000 cases referred to has also been checked up to determine the value of this rule. In a considerable number of cases shock has appeared as determined by McKesson's rule, has been reported to the surgeon, and the operation has been rapidly completed. All of these patients have recovered. Thirteen of the patients were in the danger zone as determined by this rule for from 25 to 70 minutes. Of these, nine died, giving a mortality rate of 69.23 per cent. These figures indicate the efficiency and great value of McKesson's rule for determining shock during operation.

Every operative case deserves a preliminary examination, diagnosis, and prognosis. The blood-pressure examination is distinctly valuable in making the preliminary prognosis and in the diagnosis of surgical shock. The rule of Moots for determining the resistance of the patient and the rule of McKesson for diagnosing surgical shock are trustworthy and valuable aids.

ACUTE CEREBROSPINAL SYPHILIS AND ITS TREATMENT.

QUALLS, in the *Military Surgeon* for January, 1919, states that the cases in the series which he reports, in which intraspinal medication was employed, seem to have been improved more rapidly and improvement was apparently more permanent than in those receiving neosalvarsan only.

It is believed that the administration of mercury to its limit of tolerance, in conjunction with intravenous and intraspinal medication of salvarsan, is a potent factor for good.

By employment of the proper technique the amount of serum given intraspinally may be materially increased without depression or serious after-effects, and it is believed with more rapid improvement.

A MORE INTENSIVE FORM OF ARSPHENAMINE THERAPY.

HAZEN, in the *American Journal of Syphilis* for October, 1918, states that for the past eighteen months, to a certain selected number of private patients, he has been giving injections at seventy-two-hour intervals. Up to the present time he has given ninety-eight injections to twenty-two different patients, never giving less than three and several times as high as eight doses. There was not a single untoward result; while a number gave the usual reactions of nausea, vomiting, diarrhea, and headache, there were no evidences of any increased intolerance toward the drug. In no instance was albumin demonstrated in the urine, although searched for by the heat and acid method in all cases. None of the cases showed any jaundice and none lost any weight. The preparation employed was an American brand of arsphenamine made by the Dermatological Research Laboratories of Philadelphia. The dose employed was 0.4 gramme per 150 pounds of body weight. For such a dose 70 Cc. of distilled and double-boiled water was used, and the sodium hydroxide solution was pure and fresh. All injections were given in the office and the patients allowed to go home immediately afterward.

The clinical results were very good: every case which presented lesions cleared up very shortly. Nineteen of the patients showed positive Wassermanns; in one instance a course of three injections failed to change this finding, but in all other instances, bar one, the Wassermann became negative with great promptness. The one case in which there was no subsequent report was lost sight of.

This method has not been employed as a routine, but simply in all classes of cases which would coöperate; there was no other

method of selection used. Hazen is by no means prepared to say that it is the only method or the ideal method, but only that it is very effective, absolutely safe, time-saving, and that theoretically it should be superior to the long-interval method.

THE TREATMENT OF CHRONIC NEPHRITIS.

WILLIAMS, in the *New York State Journal of Medicine* for January, 1919, states that in the treatment of chronic kidney disease the physician encounters three distinct clinical problems, each demanding quite different therapeutic measures. The classification of kidney disease on the basis of anatomical lesions is both confusing and unsatisfactory in the application of treatment. It is much more helpful to approach the problem from the standpoint of disturbed physiology, the method for which is followed in his paper.

The most common type of kidney disease seen is that of the middle-aged adult who complains of some or all of the following symptoms: tiring easily, occipital headache, shortness of breath, high blood-pressure, and little or no physical evidence of kidney disturbance except frequent and excessive urination at night. The blood is commonly low in urea, creatinin, and phosphates; the blood sugar may be high. Edema is usually not present. Death is rarely caused by uremia, rather by cerebral hemorrhage or failing heart. This is the well-known cardiorenal type.

The next most frequently seen type is the middle-aged or even younger adult who may have pronounced eye symptoms, edema, low or high blood-pressure, very little kidney reserve, urine loaded with albumin and casts, blood containing two or three times the normal amount of urea, a high blood sugar, increased blood creatinin, and phosphate retention. Death is commonly preceded by convulsions and the phenomena of uremia.

The last and much less frequently seen type is that of the young or middle-aged adult who complains chiefly of edema, weakness, pallor, and marked albuminuria. Blood urea and sugar will be found low, perhaps lower than normal. The cholesterin content of the blood may be greatly increased. The edema may or may not be influenced by the salt content of the diet. The functional capacity of the kidney is fairly normal to the usual clinical tests. The patient suffers very little headache or from the other symptoms commonly seen in kidney failure. When death occurs, it usually results from exhaustion and not from intoxication; it would seem, however, that many patients recover.

With these distinct clinical types of kidney disease in mind, we may proceed to considerations of treatment.

The first step, and one of the most important, in the treatment of any type of kidney disease is to rid the body, whenever practicable, of all focal infections. There can be no doubt that the continued absorption of toxins from bacteria of low grade has a deleterious influence upon the kidneys and vascular system, and indeed may bear a causal relation to kidney disease. The importance of investigating suspicious tonsils, crowned teeth, and diseased prostates cannot be overemphasized.

In the treatment of the cardiorenal type, after one has made sure that the patient is not harboring infection, the most important measure is rest—rest both mental and physical. The patient should get up late in the morning, retire early at night, and recline a good share of the day. If the patient has a good functional kidney capacity, he should be put on a low general simple diet. All chemical irritants in the way of spices, mineral acids, alcohol, and foods containing large quantities of animal extractives, bacteria and bacterial products should be excluded from the diet. The patient should be allowed to have some meat and eggs. An adult weighing 150 pounds or thereabouts should not eat more than 1800 or 2000 calories of food. Many patients do better on even less than these amounts. The diet should contain plenty

of green vegetables, and they should be cooked by steam rather than by boiling so that their mineral content may be retained. He has often seen this régime when continued for from three to six weeks lower both systolic and diastolic pressure from 10 to 40 mm. He has sometimes thought small doses of iodine to be helpful, and usually gives it in from 3- to 5-drop doses frequently diluted at each meal. The rest of the treatment is purely symptomatic. If the patient is constipated, a mild saline or a vegetable purgative should be given in the morning. Headache is often relieved by the application of heat or cold. When the patient is discharged, he is advised to continue to live on the low metabolic plane which characterizes the treatment. He has seen no permanent benefit come to cardiorenal patients from the use of electricity, diuretics, sweating baths, saline purgatives, or the use of the multitudinous remedies which have been advocated to stave off the arteriosclerotic process. The treatment may be thus summed up in getting rid of all focal infections, plenty of mental and physical rest, and a low simple general diet.

The second clinical type herein discussed, characterized by blood nitrogen retention, high or low blood-pressure, edema, albuminuria, etc., demands quite a different therapeutic régime than does the cardiorenal type. In severe cases, perhaps the best initial measure is to put the patient at rest and give him the limited milk and fluid diet first suggested by Karrel. In his clinic he prescribed daily for the first few days one quart of milk, one pint of water, and another pint of lime water or some salt of calcium, either the carbonate or lactate in half-drachm doses several times daily. Tincture of iron or ferrous carbonate in liberal doses is also given. Howland has shown that lime and iron both facilitate the elimination of phosphates, the retention of which, according to this investigator, causes the acidosis and death in this type of nephritis. Williams's clinical and laboratory experience confirms this view of Howland. After four to eight days of this treatment he cautiously adds orange juice, cereals, green vegetables, and raisins. If evidences of nitrogen retention in the blood lessen, the diet becomes more liberal and general. If edema disappears, water is more freely allowed. If the albumin outgo in the urine is excessive, the cautious addition of protein to the diet may be attempted. The most important step in the treatment of a serious case of this type of kidney disease, after having rid the patient of all infections, is to reduce his general plane of diet. Nephritics of this class are much like diabetics in that they seem to have very limited and definite powers of metabolism. They are stronger and do better when living on a low metabolic plane.

Death in this type is due to uremia with coma or convulsions. In the terminal stage hot packs and diuretics are supposed to have value. In his experience they have been worthless. He has tried both hot packs and diuretics on three cases which terminated fatally. In each instance the only effect was to produce exhaustion. Much greater amelioration of symptoms was obtained by the hypodermic use of morphine.

A much more satisfactory plan which Williams is now using in the uremic stage is to give the patient very little food, not more than 20 to 30 ounces of milk daily, from 2 to 6 drachms of calcium carbonate or a pint of lime-water in addition, and but very little water. A light saline purge is given in the morning; headache is controlled by an ice-bag, and extreme restlessness by morphine. Bleeding is sometimes of distinct value. In the treatment of advanced cases, much valuable aid may be had from blood chemical studies. Whenever possible, a severe nephritis should be treated in a hospital equipped to scientifically interpret the phenomena of the disease, otherwise treatment must be more or less conjectural.

The third and least common type of chronic kidney disease is the one brought into prominence by the writings of Epstein and is designated as a nephrosis suggesting a degenerative process rather than one of inflammation. Its chief characteristic is

edema. It should be borne in mind that these cases suffer much from the loss of nutrients in the albumin which escapes in the urine. In the cases which he has seen there is nothing to suggest the intoxication which accompanies diffuse parenchymatous nephritis which has just been discussed, and the treatment accordingly is quite different. The diet should be much more liberal and should contain a large amount of protein. As many as 8 to 10 ounces of meat may be very helpful. Fluids should be restricted. He has tried Epstein's plan of keeping the carbohydrates and fat low in order that protein metabolism may be stimulated. In selected cases it works admirably. Some way should be found to measure the salt intake in the food and its outgo in the urine. If there is evidence of salt retention, its use should be curtailed, otherwise it may be sparingly permitted. Before employing this dietary measure, one should be sure that the patient has a normal or even low blood nitrogen. Frequent blood chemical tests should be made during the treatment to be sure that there is normal disposal of urea. He knows of no medicines which do good except possibly iron.

Nephritis in actual practice is not quite as stereotyped as might be inferred from this paper. Oftentimes one sees cases presenting the phenomena of more than one type, and this obviously suggests a modification of the plans herein outlined. These conditions must be met along the lines indicated, with the physiological chemical studies of the blood and urine as guides.

HEART SOUNDS AND THEIR VALUE.

HARE, in the *United States Naval Medical Bulletin* for January, states that he would like to emphasize two points, one of which has been especially insisted upon by Sir James Mackenzie, who said: "A perfectly sound heart can give rise to murmurs. If the heart is not otherwise impaired, if it is normal in size, normal in rate, and the response to effort is good, ignore the murmur, it makes no difference where you hear it." Hare does not go as far as this very eminent expert in the study of the heart, but his statement is quoted to emphasize the fact that all unusual heart sounds are not evil things.

The second point is to recall that the heart is not an isolated organ independent of the nervous system and the rest of the vascular system, nor is it like a piece of machinery made of unyielding metal. Its muscle fibers have play, they vary with every need of the body in that play. Its valves are not rigid, the bases on which these valves rest are not fixed or rigid, and the chordæ tendinæ constantly vary in their tension; so, too, do the musculi papillares vary in their form. Last of all it is as important for health and for service that the vessels shall be elastic and well controlled as that the heart shall be normal, for unyielding vessels weary the heart not only by offering undue resistance but by failing in their own contractility to help in the circulation of the blood, as Ludwig and Brunton showed many years ago. Conversely, a vascular system which relaxes unduly when effort is made also exhausts the heart, which works to excess to keep the vessels properly supplied.

DEFICIENCY THEORY OF THE ORIGIN OF BERIBERI.

WALSHE, in the *Quarterly Journal of Medicine* for July, 1918, states that the series of cases described in his paper, from their clinical aspect and on the grounds of their etiology, may be regarded as true beriberi. There is no evidence in support of a recently expressed view that this, or similar outbreaks of the disease described as occurring among troops, bears any relation to epidemic jaundice and is of the nature of an infection.

A consideration of the deficiency theory of the origin of beriberi in the light of recent clinical and experimental work makes it clear that the present hypothesis, which postulates a single negative factor, namely, the absence of a specific "accessory food

factor" or "vitamine," is inadequate. It conflicts with the results obtained in starvation experiments on fowls. Starved fowls live sufficiently long to develop the disease (polyneuritis gallinarum) under such conditions, yet they die without developing it, although in this essential respect, namely, the deprivation of vitamines, starvation is the equivalent of an avitamine diet.

The use of "certain special diet" (Holst) is found to be an essential condition of the production of the disease both in man and poultry.

It is apparent from all recent experimental work, both in man and poultry, that there are two factors in the production of beriberi: (1) the absence of an accessory food factor or vitamine; (2) the use of certain foods which are the direct and immediate cause of the disease.

There is a considerable weight of evidence to prove that carbohydrates constitute this second direct and immediate factor. It seems probable that in the absence of their specific vitamine they undergo an aberrant hydrolysis with the production of toxic by- or end-products, thus producing beriberi. Viewed in this light the disease is an intoxication. The facts regarded as excluding a toxic origin of beriberi do not exclude an intoxication in this sense.

From another point of view it may be questioned whether the clinical and pathological characters of the disease are compatible with the theory that it is a slowly progressive diffuse degeneration of the nervous system. The striking symptoms of beriberi and the wide-spread visceral and nervous changes seen post mortem cannot be adequately accounted for by such a hypothesis.

A consideration of the physical and chemical properties of vitamines—as far as they are known — suggests the probability of their belonging to the class of bodies known as enzymes, and these are concerned, we may suppose, in the hydrolysis of carbohydrates.

Certain observations of Holst and Fröhlich, showing that a diet of decorticated rice or barley may produce either polyneuritis or scurvy according to whether fowls or guinea-pigs are employed, throw some doubt on the separate identity and specificity of antineurotic and antiscorbutic vitamines.

Finally it seems certain that until the physical chemistry of the vitamines and the metabolism in beriberi—both totally unexplored fields—have been more fully investigated, the pathogenesis of beriberi will remain in part obscure. All that can be said is that the theory which regards the absence of vitamines, acting by producing a slowly progressive diffuse nervous system degeneration, as the sole and direct cause of beriberi is both inadequate to explain all the facts and is incompatible with certain of them.

The genesis of the disease may be best expressed by saying that the use of certain foodstuffs, probably carbohydrates, in the absence of their accessory food factors or vitamines, directly causes beriberi.

TREATMENT OF SPRUE.

PATTERSON, in the *China Medical Journal* for November, 1918, states that the treatment of sprue has been greatly improved by the use of salvarsan, neosalvarsan, or their substitutes, in addition to emetine. This method he thinks was first used by Lunn, of Manila, who reported 24 cases with uniformly good results. Sodium cacodylate is evidently equally as good as salvarsan.

The arsenical preparations are very effective in checking the diarrhea, and for a time they change the color of the stool. There is no doubt as to the good of "606" or the cacodylate of soda. Emetine is useful to reduce the mucus in the throat and stools. Should there be pyorrhea alveolaris, which is seen in many cases, there is all the more reason for its use. Lunn recommends the following: Sodium cacodylate grains 6, every other day until eight doses are taken, hypodermically; and emetine, grain ½, every day until ten doses are taken. He recommends milk, or buttermilk, until the diarrhea stops; then rice and eggs. This more liberal diet recommends itself because it is neither prolonged nor

very rigid. Moreover, he believes it would prevent the great loss of strength which is experienced on the twenty-four days' milk diet.

Diet.—Probably a suitable diet is more necessary than medicine, but the choice is very limited. Milk only, or milk and fruit, is quite the best diet for some patients. A close second is meat only, which for some seems to be preferable.

(*a*) *Milk diet:* For a patient whose normal weight is 150 pounds, Carnegie Brown recommends the following:

MILK ONLY.

Time.	Days 1-4	Days 5-8	Days 9-12	Days 13-16	Days 17-20	Days 21-24
4 A.M.	8 oz.	8 oz.	10 oz.	12 oz.	12 oz.	12 oz.
7.30	8	8	10	10	14	14
10	8	10	10	12	14	14
1 P.M.	8	10	10	10	12	14
3.30	6	8	10	12	12	14
6	8	10	10	12	12	14
8	6	8	10	12	12	14
10	8	8	10	10	12	14
	60 oz.	70 oz.	80 oz.	90 oz.	100 oz.	110 oz.

After 80 ounces are reached, fresh fruits are recommended. Among all the fruits, strawberries are considered by far the best. Apples, pears, grapes, and bananas have all given good results. For the first few days the weight is likely to continue to fall off on this diet, but thereafter a steady gain is to be expected. During the milk diet the patient must be confined to bed in a warm room. On this treatment the pain, distension of abdomen, and distress soon subside.

(*b*) *Meat diet:* The milk diet is followed by four days of meat alone. During the milk diet the stools are a light yellow, but once the meat has been begun the stools turn to a dark brown. The amount of the stool is less and not so constipated as on the milk diet. Two pounds of beef are required a day. This should be divided into six portions, and boiled or fried in butter at eating time.

(*c*) *Modified meat diet:* On this diet, one or two eggs slightly boiled are allowed for the first morning meal. Fruit is again added. Both he and his patients have followed Brown's diet, "C" and "D"; from this point Lunn recommends eggs and rice. He has found this very acceptable.

A word of caution from experience should here be set down. This is that eggs and milk, and milk and meat, are incompatible. In this regard he agrees with Brown and has verified it by his own experience and that of five other patients. Later in the treatment, eggs may again be entered on the diet list, but only after the milk has been stopped.

As soon as the diagnosis is made the treatment should be begun. A mistake that Patterson has made twice is to send a sprue patient on a sea voyage in cold weather. This is sure to lessen the chance of recovery owing to the cold and because of the exertion necessary on a trip. The acute symptoms should be dealt with when found, and no move should be made until warm days come and the acute symptoms have passed.

Signs of Improvement.—There are three things that every sprue patient desires: (1) a comfortable feeling in the abdomen after eating and a clean-tasting mouth; (2) gain in weight; (3) a dark-colored stool. These all come in the order mentioned on this diet.

Milk should be the sole food for six weeks from the time the stools become solid and the mouth symptoms disappear.

TREATMENT OF NEUROSYPHILIS.

Gooken, in the *American Journal of Syphilis* for October, 1918, states that the manifestations of cerebrospinal syphilis are due more to the toxic products produced by the spirochete than to the presence of the spirochete *per se*. To the retarded entrance of immunity bodies into the cerebrospinal canal might be added that when this does take place these antibodies are not specific against those toxins which it is desired be rendered innocuous. Toxins vary with the composition of the culture media upon which they are elaborated. It is known in the production of antitoxin that variation of the culture media will produce a toxin, which while toxic of itself will not generate an antitoxin specific for the toxin produced by the microörganism in the living host. So in syphilis, it could be as-

sumed that the toxin elaborated in the peculiar constituents of the cerebrospinal tract differs from the toxin formed in somatic syphilis. Also that the antibodies produced against a systemic syphilis are not specific against a "nerve-derived toxin." Neither, as has been stated, does the cerebrospinal tract possess the property of generating immune bodies.

For this reason the intravenous introduction of spinal fluid is advocated—that is, it will stimulate the production by the blood of antibodies specific against the peculiar toxin which the spinal fluid contains. A positive chemotaxis toward the spinal canal will be created, carrying with it these antibodies, and their entrance into the spinal canal will be enhanced by the increased permeability of the meninges, brought about by an aseptic inflammation caused by the Swift-Ellis treatment being instituted at the same time.

The following is the method adopted by Gooken: Daily inunctions of mercury are given during the entire course of the treatment. At the end of fifteen days this is supplemented by weekly Swift-Ellis treatments, adding to the salvarsanized serum just before inactivation 1/50 grain of mercury benzoate, dissolved in 1 Cc. of physiologic salt solution (Lautman method). Immediately after the serum is introduced into the spinal canal, the spinal fluid which has been withdrawn is injected intravenously.

By this method is exhibited all the advantages claimed for the intensive mercurial and salvarsan systemic treatment; the intraspinous introduction of mercury salts; the Swift-Ellis treatment; and those biologic advantages which might accrue from the intravenous injection of spinal fluid. This latter advantage is, of course, conjectural, as there has been no opportunity to reach definite conclusions by experiment. It does, however, give promise that such investigation might be profitably conducted.

While only a small number of cases have been treated in this way, a thorough and complete laboratory study of the spinal fluid has shown that in this light at least the results were equal to that accomplished by twice the number of Swift-Ellis or mercury benzoate treatments. For instance, comparing findings in this method with those of the previous methods, it was found that by this procedure three treatments gave a laboratory improvement equivalent to that of six of the other treatments mentioned.

The reactions have seemed less severe than those attending the other methods. It would be expected that adding a mercurial salt to a salvarsanized serum would increase the irritant constituents, causing a proportionately more vigorous reaction, but this has not been found true. Probably mercury and arsenic each have a selective action in the spinal canal, and the combination of both is not equivalent to an increase in either salt in this regard.

Clinically, the few cases so treated have lent encouragement to further use and observation of this method of treatment.

The intravenous injection of a spinal fluid having a four-plus Wassermann test has not been found to influence a negative blood Wassermann.

ABNORMAL NAUGHTINESS IN NORMAL CHILDREN.

THOMSON, in the *British Journal of Children's Diseases* for October-December, 1918, states that occasionally a child of perhaps three or four years or older is brought to the doctor because he is becoming so persistently and enterprisingly naughty that his parents have begun to doubt whether he is altogether right in his mind. He is generally found to be healthy and attractive-looking and above the average in intelligence as well as in force of character, although we are given such a bad account of his conduct. We are told that the child is constantly doing wilful mischief—throwing china out of the window, knocking over flower-glasses, scattering beads or other things that are difficult to pick up again, breaking in upon other children's games so as to spoil their play, locking doors and throwing away the keys,

pulling out drawers and emptying their contents on the floor, setting fire to anything that will burn, playing unkind tricks on the cat, or even upsetting the baby out of the cradle. The account of the child's misdoings is rather amusing, and one notices that, in spite of the anxiety which has occasioned the consultation, the parents describe them with just a touch of pride, and a feeling that not every child would have the energy and cleverness to be so entertainingly naughty.

When we inquire into the treatment that has been tried, we usually find that, until recently, the child's mischief has been laughed at and rather encouraged. Since the parents have thought more seriously about the matter, however, the young culprit has been subjected to a course of severe corporal punishments, reprimands, and expostulations; and it has been attempted to make him ashamed of himself by relating his misdeeds to friends and neighbors in his presence with severe comments. These measures have not caused the slightest improvement.

On considering the child's conduct, we see that the things he has been doing were calculated to give him little or no pleasure in themselves, yet they were a very real source of gratification because of the sensation they produced among his seniors. The effect of his misdeeds in disturbing his parents is, then, the source of their attractiveness to him; and so great is the child's enjoyment of this that the beatings and other unpleasant experiences that followed have counted for nothing against it. They have been taken indeed merely as evidence of the greatness of the impression he has succeeded in producing.

What is wrong in such a child in such cases is a morbid exaggeration and perversion of the natural desire which all children feel for notice by their elders. He craves to be the most noticed person in the household, and the obvious though unexpressed admiration provoked by his boldness and resource is all the inducement he needs to encourage him to continue.

It is, Thomson thinks, clear that these cases of abnormal naughtiness in normal children are of essentially the same nature as those of "moral imbecility" in children who are in some degree mentally defective. The treatment of the two sets of cases is the same, but the mental defect in the latter group makes their treatment at home much more difficult, if not impossible.

The proper lines of treatment are clear enough, and when carried out consistently and thoroughly are rapidly and completely successful. They may be summarized as follows: (1) All severe corporal punishment must be stopped—it never does any good. (2) Nobody must ever appear shocked, amused, or even surprised at anything the child does. (3) His misdeeds are never to be alluded to, much less described, in his presence; and, lastly, he should be noticed and encouraged in every way when he is good, and altogether ignored when he is naughty.

NITROUS OXIDE IN LABOR.

ALLISON, in *Northwest Medicine* for January, 1919, states that his experience with nitrous oxide leads him to believe that we have in this agent the panacea we have been working for to bridge over the suffering ordinarily endured from the end of the first stage to the time when complete anesthesia is desired or when the head is well down on the perineum. He has remarked previously that the reports on the success of this method vary greatly, but those who have used it most are most enthusiastic in its support. Hence it would seem that failure in a great many instances is due to inexperience and to not paying attention to the details that are so essential to its success.

First of all a trained anesthetist, unless he is acquainted with obstetric needs, will not make a success of nitrous oxide in labor. The most complete failure he has had with nitrous oxide was the first time he used it, and it was given by a demon-

strator of a gas machine. He now realizes that he paid no attention to the details that he has since learned to be so essential. The use of gas demands the presence of one who is acquainted with its administration in obstetrics. When the pains become severe gas is given intermittently. It is useless to start the inhalation of nitrous oxide after the patient says her pain is starting. It must be remembered that she is not in a state of partial anesthesia but is fully conscious almost immediately the cone is removed. To obviate this difficulty the hand of the anesthetist must be kept on the abdomen, and at the very beginning of the contraction, before the pain is appreciable to the patient, the gas should be begun and the cone removed at its height. In some patients three or four inspirations will suffice, while others to get the same effects will require the gas throughout the contraction.

On account of its indirect supply of oxygen the fetus has more tissue changes from nitrous oxide than the mother. Hence it is very patent that cyanosis in the mother should be avoided in these cases, for the effects on the fetus are even greater, so that a large enough percentage of oxygen should be given to avoid this, which will vary in different cases. He does not believe there is any definite percentage of oxygen to be used. The rule should be to give enough to avoid cyanosis in the mother. Davis has found that the long-continued use of nitrous oxide, even if given intermittently, has been responsible for some tissue change. Hence he warns against its long-continued use. Some have arbitrarily put the time not over three hours.

He has found in the patients who complain early that a long anesthesia is avoided and pain controlled by the administration of morphine and scopolamine a little before the end of the first stage. He believes that this aids a great deal in the success of the nitrous oxide which is to follow later, and it shortens the stage of dilatation. He has said that nitrous oxide furnishes a bridge from the end of the first stage to the time ether and chloroform may be used. His experience has been that this is just its sphere, for he believes that complete anesthesia with nitrous oxide should be avoided, and as the perineal stage, for its proper control, requires this degree of anesthesia, he thinks that ether is for this time the anesthetic of choice.

A great deal has been written about the expense of nitrous oxide in labor. Allison's experience has been that it costs about three cents a minute. Gas machine companies estimate one cent a minute, but he has never been able to do it so cheaply. Total cost, of course, depends on length of administration. His average is perhaps two to three hours, although he has given it to six.

He has been using nitrous oxide in obstetrics during the past two years whether his patients could afford to pay for it or not, for the reason that it not only made the trials of his patient less, but it has also made the handling of these cases much easier for him. He feels that one of the great hardships of this branch of our profession is having to witness suffering which hitherto we have been unable to relieve without endangering the life of the child through delay in the progress of labor and through the effects of the drugs themselves on the fetus.

From statistics he has at hand and from his own experience he has reached the following conclusions in regard to anesthetics in labor:

1. Nitrous oxide furnishes us with a drug to control pain in labor during a time that we have hitherto been unable to relieve it because it does not affect the progress of labor.

2. Nitrous oxide, when given to a degree of analgesia and intermittently, is safer than chloroform or ether on account of its rapid elimination and hence more transient tissue change.

3. On account of longer period of control of pain, the nitrous oxide method relieves the patient of the postpartum

exhaustion commonly seen and there is a consequent freedom from shock.

4. All of the agents we are using in obstetrics must be regarded as having some element of danger attached to their use and should be given with an understanding of that fact.

CALCIUM CONTENT OF THE BLOOD IN INFANTILE TETANY.

HOWLAND and MARRIOTT, in the *Quarterly Journal of Medicine* for July, 1918, in summarizing a paper on this topic state that the various theories as to the pathogenesis of infantile tetany refer it (*a*) to disease of the parathyroid glands, (*b*) to the character of the food, (*c*) to intoxication by calcium, (*d*) to intoxication by guanidin or methylguanidin, (*e*) to a lack of calcium. The evidence at present available fails to confirm the majority of these theories. These writers have approached the problem from the standpoint of the calcium content of the blood serum.

By a method which they have devised they have been able to show that the normal calcium content of the serum is from 10 to 11 mg. per 100 Cc.

In rickets there is a moderate reduction of the calcium in some cases (to 8 mg.), but a number of the apparently active cases which they have studied have shown a normal amount of calcium.

In tetany, during the active symptoms, the calcium of the serum invariably is greatly reduced and may fall as low as 3.5 mg. The average calcium content of the serum in eighteen cases was 5.6 mg.

In convulsive disorders other than tetany there is no reduction in the calcium of the serum.

The cause of the calcium reduction in tetany has not been explained. The inorganic phosphates of the serum are not significantly increased.

The magnesium of the serum in active tetany is within normal limits.

Tetany results at times from the administration of large amounts of sodium bicarbonate. They have found no evidence that "alkalosis" is a factor in the production of infantile tetany.

Cathodal hyperexcitability has invariably been accompanied by a marked reduction of the calcium of the serum.

Anodal hyperexcitability has been accompanied, in the majority of instances, by a slight reduction of the calcium of the serum.

Calcium administration produces a prompt effect upon the course of tetany. In a few hours the spasmodic symptoms disappear. The calcium must be continued, however, for a long time.

Calcium chloride administered by mouth causes an increase in the calcium of the serum coincident with the cessation of symptoms, although, in most instances, the calcium of the serum does not return to quite normal figures.

PROCRASTINATION: ITS RESULT IN THE CARE AND TREATMENT OF THE EYE.

MOORE, in the *Albany Medical Annals* for January, 1919, calls attention to the fact that in no department of medicine is an early diagnosis and a prompt employment of remedial measures more important than in ophthalmic practice.

Even at the very threshold of life the innocent babe may experience the direful result of this procrastination. The prophylactic use of the silver nitrate in the eyes of the new-born is sometimes put off until a swelling of the eyelids and a discharge of pus from beneath them occur. Fortunately this is not true of all cases of confinement, but occurs frequently enough to count against some physicians or midwives. Even when the discharge appears there is often a further delay ere competent advice is sought. Ophthalmia neonatorum adds one more case to those of preventable blindness.

The baby grows, begins to notice objects, but parents observe a peculiar appearance about one of the child's eyes. It becomes

more marked, a yellowish reflex is seen in the pupil, the iris changes in color. Parents neglect calling attention of their family physician to the condition, and even after his advice is sought watchful waiting is at times the only counsel given. When at last the eyeball is removed for glioma of the retina it is too late to check the progress of the disease, and frequently after months of suffering death ensues. A life has been needlessly sacrificed.

Parents and relatives notice that the young child does not seem to fix its attention on objects, though it otherwise develops normal in most respects. Although its attention is attracted by bright light, it moves its eyes from side to side aimlessly, as if seeking what it cannot readily discern. Even a cursory glance shows the pupils grayish in color instead of the normal black. There has been some prenatal nutritive disturbance and total congenital cataract has resulted. Many times a wait of several years ensues before the advice for an early operation is heeded, and the result then obtained is not as good as anticipated.

Congenital cataracts demand early operation when the general condition is favorable. Early removal is of the greatest importance in order to prevent amblyopia from non-use, for obtaining better vision, for causing disappearance of the nystagmus which impairs acute vision, and for promoting mental development.

The young child old enough to play with toys, to look at picture-books and small objects—in other words, beginning to use his power of accommodation and the associated convergence of the visual axes—is noticed to have a "cast" in one eye or the other. This is frequently associated by the parents with some recent illness or attack of worms, and they wait for the eyes to become straight as health improves. This decision is frequently concurred in by the family doctor. Sometimes years may elapse before any remedial measures are taken. The squinting eye not receiving images at the macula, lessens in visual acuity, and when finally competent advice is sought, operation is usually necessary to cure the strabismus and the squinting eye possesses little useful vision; amblyopia exanopsia might not have resulted and operation not been necessary had the underlying cause of the squint been treated, a cycloplegic used, and the error of refraction properly corrected.

There are other ocular troubles among these little ones that science, aided by skill, cannot help: eyes sightless from congenital defects or blind as the result of some neglected or maltreated inflammatory condition; vision, perhaps not even perception of light, or, if more fortunate, so reduced that much of the outer world is beyond their power of comprehension, if vision alone is to be their guide. Here it is our duty to insist that these children be placed in some school for the blind at the earliest age that it is possible for them to be taken from their home surroundings, in order that they may be fitted to make the most of the senses still left to them.

It hardly seems possible that any acute inflammatory process about the eyes of a child would be left untreated, or inefficient and often decidedly harmful home remedies used, for days or even weeks before some physician sees the case. Yet it is true, and these parents or guardians seldom seem to realize the harm they have done by their delay. How often are children brought to us, the face buried in their mother's arms, the lids tightly closed—marked blepharospasm and photophobia. Had advice been sought earlier, a simple line of treatment, the correction of a faulty system of feeding, and placing the child under proper hygienic surroundings, would have quickly effected a cure of the phlyctenular conjunctivitis and keratitis, that perhaps has at this time left marked and permanent opacities upon the cornea. Equally inexcusable is the delay in properly caring for the various forms of conjunctivitis found in childhood; again time is lost in the home treatment that cannot possibly take into consideration the etiological factor that is causing the trouble in

that individual case, and when the patient reaches the specialist a lengthy course of treatment is often necessary, whereas if seen early a few days would have sufficed.

There is a conjunctival disease occurring at all ages, formerly more prevalent among children than at the present, important on account of its disastrous complications and sequelæ which are responsible for many cases of partial or total blindness; it is highly contagious, and in institutions if unnoticed may rapidly spread from one to another. Delay in isolating suspicious cases, or delay in giving proper treatment in the early stage, has, in days past, and alas! occasionally even at the present time, been responsible for allowing an epidemic of trachoma to gain such headway that months of treatment of many cases have been necessary instead of a few mild cases quickly cured.

MORO'S PERCUTANEOUS INUNCTION TEST AND VON PIRQUET'S CUTI-REACTION TEST: WITH CASES IN WHICH THEY WERE APPLIED.

ALLAN, in the *Glasgow Medical Journal* for January, 1919, has submitted the record of his clinical experience with the Moro and Von Pirquet tests. The results of these tests at the first glance present a variety, and sometimes an apparent inconsistency, which is somewhat disconcerting.

Further consideration, however, helps to explain the variations, and to reconcile some at least of the apparent contradictions. When we apply these tests to cases in which T. B. have been found, and cases in which there is evidence of phthisis derived from physical examination of the chest, one may be at first surprised to get negative results. But if the cases are advanced, and with pyrexia, we need not be surprised, for it is known that such cases fail to give a reaction. Slight or early cases give the best response.

When we get a positive reaction in cases in which the bacteriological report is negative, it is to be borne in mind that the failure to detect T. B. is not a conclusive proof that the patient is free from tubercle. And the same applies to a negative result from auscultation and percussion of the chest. Even a skilled and experienced physician may fail to detect the lesion in a tuberculous lung.

When we get a positive reaction we may conclude that the patient is affected with tubercle, but it is not necessarily active; it may be latent tubercle.

The impression left on his mind by the application of these tests is that they are, on the whole, helpful aids to diagnosis. And these cutaneous tests have the advantage that we may use them without fear of doing harm.

PNEUMONIA: HEART TONICS IN.

IYER, in the *Indian Medical Gazette* for December, 1918, states that amongst many other heart tonics only one meets most of the indications. In sparteine we have a remedy that does that very thing. It is said that it adds to the tone of the heart muscle as greatly as does digitalis; also reduces the frequency and increases the force of the heart's action, but instead of contracting blood-vessels and increasing arterial blood-pressure, it has directly the opposite effect. Its effect upon the arterial capillaries is further said to be similar to that of belladonna, and even more in so far as its effect is not confined to the superficial arteries but extends to the deeper capillaries as well.

This dilatation of the capillaries by reducing the blood-pressure will relieve the heart of its burden, thus enabling it to handle the volume of blood without laboring and to throw an ample current to the lungs, where the improved capillary circulation could promote abundant oxygenation. Its power of improving the arterial capillary circulation will enable it to act as a most certain, efficient and non-irritating diuretic.

It may be claimed that digitalis is a popular remedy with the profession as a

diuretic. A good diuretic is one that either directly or indirectly dilates the capillaries of the kidneys and allows a larger amount of blood to pass through them and consequently a greater amount of urine to be secreted. But the active principle of digitalis, viz., digitalin, contracts the capillaries and, therefore, is not a good diuretic. In pneumonia a decrease in the volume of blood is needed almost as badly as the toning up of the heart, and here, too, sparteine could serve the purpose better.

Thirdly, its action is said to be prompt if given hypodermically. Its effects are said to be well established within an hour, being in that respect very unlike digitalis; but in point of duration of effect it is again like digitalis, the effect lasting from six to twelve hours—in fact, it has almost the promptness of strychnine with the sustained effect of digitalis.

THE BEHAVIOR OF THE BLOOD TOWARD OXYGEN IN INFLUENZAL INFECTIONS.

HARROP, in the *Bulletin of the Johns Hopkins Hospital* for January, 1919, states that:

1. The oxygen capacity and oxygen content of blood withdrawn from a peripheral arm vein have been determined in four cases of influenza during the hyperacute stage, and in nine cases of bronchopneumonia following influenza.

2. Both oxygen content and oxygen unsaturation showed normal values in uncomplicated influenza cases.

3. In none of the cases of bronchopneumonia which recovered, and not until the terminal collapse in the fatal cases, has the venous oxygen content or the amount of oxygen unsaturation been abnormal. The values seem independent of temperature, pulse, respiration, and extent of lung involvement.

4. In two fatal cases with septicemia, after the terminal collapse, there was a progressive fall in both the oxygen-combining power and the oxygen content of the venous blood, in general, parallel.

5. There was no increase at any stage of the disease in the values for the oxygen unsaturation of the blood.

[This would seem to indicate that oxygen inhalations are of little value.—ED.]

SLOW INTRAVENOUS INJECTION OF ANTISERUM TO PREVENT ACUTE ANAPHYLACTIC SHOCK.

LEWIS, in the *Journal of the American Medical Association* of February 1, 1919, states that acute anaphylactic shock can be prevented in sensitized experimental animals by giving otherwise fatal doses of diluted antigen intravenously at very slow rates.

So far as his results can be applied to man, it is to be recommended that when immune serum must be given intravenously, it should be given slowly and in a diluted form, the Woodyatt pump serving as an excellent means of doing so. The exact quantitative relations must be worked out experimentally with patients. At present it can only be said that the injections should be made as slowly and the dilutions as high as is convenient or necessary under a given set of conditions.

PURGING BEFORE AND AFTER ABDOMINAL SECTION.

BYFORD, in the *Journal of the American Medical Association* of February 15, 1919, states that before we can discuss preparatory purging intelligently, we must define what we wish to do by it, and how we do it. He supposes that the main purpose is to cleanse the bowels of any gas or feces that might interfere with the attainment of the best results from our operative work. Another is to have a comparatively empty colon in those cases in which it may be desirable to keep the patient constipated for two or three days after the operation.

The main argument against such purgation is that it seldom cleanses the bowel and more often increases than diminishes the abdominal distention; and this really seems

to be the case in many instances. An examination of the way in which it is ordinarily carried out in practice will show why: When a plumber cleans out a sewer, he does not put dirt into it at the same time, because he knows better; but when the average surgeon prescribes a laxative to clear out the bowels, he allows food to be taken a short time before the laxative is given and permits or orders more to be taken before the laxative has quit working. The result is that instead of cleansing the bowels, the laxative merely moves everything onward. It expels old fecal matter and gas together with the digestive secretions and ferments while the stomach is delivering food into the duodenum. This food not only does not find the normal secretions for its digestion, but it is rushed onward too fast for digestion and arrives in the colon as food for bacteria rather than for the patient. Not only is this true, but more food is usually given before the intestine has recovered from its fatigue sufficiently to take care of it. As a consequence it becomes distended, whether it has been so previously or not. If such is the ordinary preparatory purging—and he thinks it is—then much argument and experimentation is not required to condemn it.

This may be said to conclude the argument from the objector's standpoint, but it does not touch on the merits of the question. The question is whether a laxative can be given to accomplish what we give it for, and if so how. He thinks it can, if what he calls the four R's are observed, namely, the right laxative, in the right dose, at the right time, and under the right conditions.

The Right Conditions.—To begin with the last R mentioned, the surgeon or some one else should prescribe the conditions under which the desired results of the laxative can be secured. The material for the renewed formation of gas should be kept out of the alimentary canal; the last food that the patient takes before taking the laxative should have time to leave the duodenum and to be absorbed before the rapid peristalsis connected with purgation begins. After the purgation has ceased, none but easily digested food in properly regulated quantities should be given, such, for instance, as the quickly absorbable forms of sugar, meat extracts, or nutritive wines, or, if the patient is very weak, predigested food, until the upper intestine has sufficiently recovered from its fatigue to assume normal function, which may be before or not until after the operation, according to the requirements of the patient. The fact that such severe restriction of the diet is required, however, constitutes an indication for limiting our attempt at securing a collapsed or partially collapsed intestine to those cases in which the intestine is not already sufficiently collapsed and in which the conditions of the operation require it.

The Right Time.—The timing of the laxative must be such that any residual gas that may be left will have a chance to be absorbed. Thus, for a forenoon operation, the laxative will have to be given early on the day before, or in some cases the night before that. For an afternoon operation, it will ordinarily be required the night before the operation, and sometimes earlier. If the object in view is to get the patient in a good condition for the operation, it may have to be given three or four days before; and the alimentary canal for two or three days may have to be allowed to functionate normally and under low pressure, if one may be allowed to use the term.

The Right Laxative and the Right Dose.—On account of the variations in the character of the different operations and the differences in the condition of patients, the kind and amount of purgation should be adapted to the requirements of the concrete case. One abdominal section may require a low incision, another a high one; one a large incision, another a short one; one patient may require work at the bottom of the pelvis, another at the surface; one intestinal work, another none; one operation may be a long one, another a short one; one may require general anesthesia, another local only; that is, in one patient no attention to the bowels may be

required, even though they are somewhat distended, while in another a carefully conducted preliminary purgation may be essential to reduce the distention and enable the operator to do good work.

Again, a patient may come to us half-starved and with collapsed intestine, and may not even need an enema, or perhaps only a mild stimulating one to relieve the sigmoid flexure, or an ox-gall enema to soften and remove a few hard fecal masses from a dry and sluggish rectum. In such a case only harm could come from ordinary routine purgation and dieting. On the other hand, a patient may be a strong, hearty eater, with a full abdomen and powerful abdominal muscles, who requires active purgation to remove foul gases and diminish intra-abdominal pressure, and who can stand any amount of dieting. One patient may be constipated habitually and on that account require a powerful laxative, another may always have daily movements and require only an enema; one may have accumulation of fat both inside and outside of the abdominal cavity, while another may be emaciated; one may have idiosyncrasies with regard to laxatives, enemas, or anesthetics, another may feel as well after purgation or anesthesia as if he had not taken them, while another may have an organic disease that diminishes his resistance or otherwise makes him a bad risk.

Now, who would advocate sending patients for such a variety of abdominal operations and exhibiting such dissimilar conditions to a hospital, to be prepared in a routine way with routine purgation, perhaps without seeing them again until he finds them on the operating table? And yet such is the case in some of our clinics in large, crowded hospitals, where routine is essential to keep things going, and where individualization may be possible only in private cases.

The laxative should be selected, the dose regulated, the time for its administration chosen, and the conditions under which it acts carefully adjusted to suit the requirements of the concrete case instead of being used in a routine way. Then there will be no occasion for the rejection of purgation in the preparation of patients for abdominal sections.

It should be remembered also that the colon bacillus is not very virulent, that it kills people only under exceptionally favorable circumstances, and that patients in normal condition and without abdominal distention do not require a stirring up with laxatives before an abdominal operation. A restriction of the diet will sometimes promote abdominal flaccidity better without a laxative than with it.

MAGNESIUM SULPHATE SOLUTIONS FOR BURNS.

Dr. S. J. Meltzer, of the Department of Physiology and Pharmacology of the Rockefeller Institute for Medical Research (*New York Medical Journal,* Feb. 15, 1919), in the course of a study of the action of magnesium sulphate on the nervous system has found that a concentrated solution of this salt had a very favorable effect as an application in scalds and burns. His original experiments, which are now published for the first time in the *Journal of Pharmacology and Experimental Therapeutics* for November, 1918, p. 211, though made many years ago, showed that the ear of a rabbit which had been scalded by submersion in water at a temperature of 62.5° C. for two minutes was protected from serious injury by immersion in a 25-per-cent solution of magnesium sulphate for three hours, though a little sloughing did occur at the tip. Subsequently this was tried in burns on human beings, and it was found that burns of the second degree are invariably arrested in their development when a molecular solution of Epsom salt is applied early. As a rule burns of the third degree run a more favorable course under magnesium sulphate solution than under any other treatment. Solutions more concentrated than 25 per cent had an even better effect. The good results were not so noticeable in the ad-

vanced stages of burns on account of the infection usually present, but even then it had a favorable influence.

REPAIR OF URETHRAL DEFECTS BY TUBULAR GRAFTS OF VAGINAL MUCOSA.

LEGUEU (*Journal of Urology*, Vol. II, No. 5, 1918) records a case of repair of urethral defect accomplished in four steps by the use of transplanted vaginal mucosa. The technique advised is as follows:

The resection must be preceded by a temporary urethrostomy which involves the suture to the skin of both ends of the wounded urethra; upon the result of this operation depends the functional success of the ultimate result.

After making this urethrostomy, several months must elapse before applying the graft in order to work on uninfected tissues. The orifices must also be dilated in order to prevent a stricture.

The second preliminary requirement is a suprapubic cystostomy. It is preferable to establish this before the urethrostomy. Perineal diversion of the urine is not satisfactory since it leaves a more or less infected wound near the point of grafting. Finally, in order that the graft shall take, the tissue should be prepared by tunneling. This is a general principle applicable to all grafts of foreign tissue in the urethra, which should always be made beneath the skin. When transplanting veins we have had several failures because of placing them beneath the skin incisions. The tunneled canal cannot break down. Thus one of the causes of failure is removed.

These fundamental conditions being realized, the operation is performed in the following setps:

Excision of the graft. A woman requiring colpoperineorrhaphy, preferably otherwise healthy and not syphilitic, is anesthetized, and from the posterior wall of the vagina a flap of vaginal mucosa is resected, the length of which should equal the length of that portion of the urethra to be replaced, and its width sufficient to surround completely a 17- or 18-F. bougie. While this portion is being completed an assistant prepares the graft, which is kept moistened with artificial serum. The raw surface of the graft is first denuded of all cellular and fatty tissue. It is necessary to make it as thin as possible, for the epithelial surface is all that is of value. The rest is only accessory, and the graft will always be placed in a canal which is rather tight for it. Next the assistant sutures the vaginal mucosa about a 17- or 18-F. olivary bougie with several extremely fine silk sutures. The two ends of the graft are ligatured about the bougie with catgut sutures whose ends are left long to assist in threading the graft into the perineal tunnel.

The patient is anesthetized and placed in the lithotomy position. The two ends of the urethra are freed from the skin. A special trocar provided with several cannulæ of various lengths and calibers is then plunged into one of the urethrostomy wounds and brought out through the other. The trocar is then withdrawn, leaving the cannula in place.

The application of the graft is always a delicate one. The graft is always too big for the trocar, for the latter cannot be large enough without endangering the vitality of the skin. It may be necessary to remove the graft from the bougie and to introduce it without any guide into the cannula. This is done by passing a small platinum hook through the cannula to catch one of the catgut sutures and draw it through with the graft following. The cannula is then withdrawn and the graft is in place.

The two ends of the urethra are very accurately sutured to the ends of the graft by a series of very fine silk interrupted sutures. This must be placed accurately but with as little manipulation as possible, in order not to diminish the vitality of the graft and thus favor sloughing by traumatism and pressure.

The two cutaneous fistulæ are closed by dissection of the underlying tissues and suture of the skin over the urethra with silkworm-gut.

The perineal dressing is left in place for

eight days. There will then often be found a slight breaking down of the tissues at the points of union of the graft and the urethra, but in none of the author's cases has the graft been eliminated. Eight days later a small bougie is very gently introduced, and thereafter the urethra is dilated progressively until bougies can be readily passed. Thereafter the caliber of the canal is maintained by bougies or sounds. There are several subsequent operations required, but these are slight secondary ones of little importance and which merely prolong the duration of the treatment.

THE PROTECTIVE MASK IN CONTAGIOUS PLAGUES.

Dr. Plicque writes on this subject in the *Journal de Médecine et de Chirurgie Pratiques* of October 25, 1918. The use of these masks goes back to great antiquity, and apparently was very extensive. Excessive fetor of the breath was regarded to a certain extent as indicative of contagion. In the plague of Athens, in 429 B. C., the fetor, which was cadaveric in type, was said to have been perceptible at a great distance. In the great pestilences of the middle ages the custom of wearing a cloth before the face saturated with some real or supposed antiseptic is frequently mentioned by contemporaries. The modern, systematic use of a mask for lung plague goes back only to recent years. It was originally suggested or devised by Broquet, according to the writer, who, however, gives no data as to time, place, etc. We are told that this mask was used in the severe epidemic of the Manchurian pneumonic plague which prevailed in 1910-11. The Japanese surgeons also devised a mask for this emergency, while others were extemporized.

It is worthy of note that certain members of the profession ridiculed the idea of the mask (just as was the case in the recent epidemic of influenza); and they paid the penalty by contracting and dying from the disease. The conditions are by no means the same, for the deadly type of grippe-pneumonia was not transmitted as such, but as the basic influenza, and we were informed that but 3 per cent of these grippe-pneumonias were primary, so far as New York was concerned. In the Manchurian plague, French and Russian physicians perished until they began to use the masks, while the Japanese, who wore them from the start, did not lose a man among physicians or medical auxiliaries. According to Plicque, the grippal bronchopneumonia may be very contagious, especially in the adolescent and younger men, and when these are poorly nourished the fulminant course is appalling. While patients cannot, of course, wear masks when actually ill, they should make use of them during the period of recovery to protect their entourage. The author is inclined to regard, like the ancients, unusual fetor of breath as evidence of contagiousness.—*Medical Record,* Dec. 21, 1918.

INEQUALITY OF THE PUPILS.

Barrie (*British Medical Journal,* Nov. 9, 1918) in order to gain some idea of the frequency of this condition examined for this peculiarity, in the course of his work as an ophthalmic surgeon in the Glasgow recruiting area, the eyes of 326 men who had been sent for special examination. Inequality of the pupils was found in 35 cases, a proportion of 10.73 per cent. In none of these cases was there any sign of ocular disease nor manifestation of disease of the central nervous system. The pupils reacted readily to light, and the consensual and convergence reflexes were normal; in each case the inequality persisted in the contracted state.

The inequality in every case was indisputable, the difference between the diameters of the two pupils being from one to two millimeters. This difference is not large, but as pupils are compared by areas it was easier to note differences than to measure them. For example, pupils having diameters of 3 and 2 mm. respectively have areas in the proportion of 9 and 4.

An analysis of these 35 cases gave the following results:

The left pupil was the largest in 21 cases, the right in 14.

The visual acuity without glasses was the same in 10 cases; the right eye had the higher visual acuity in 8 cases, the right pupil being the larger in 4; the left eye had the higher visual acuity in 17 cases, the left pupil being the larger in 13.

There were refractive conditions in 35 of the cases.

The conclusions which may be drawn from this investigation are as follows: Inequality of the pupils is frequent. It is associated with all refractive conditions, with a tendency to be more frequent in myopic conditions. The visual acuity is not affected adversely by the fact that one pupil is slightly larger than the other. The left pupil is more frequently larger than the right. Inequality of the pupils occurs as a physiological condition.

SURGICAL SHOCK.

GUTHRIE (*Pennsylvania Medical Journal*, December, 1918) concludes a general discussion on this subject by the recommendation that the term shock be reserved for the condition exemplified by the acute clinical state; and that the term collapse be employed to designate the moribund state following shock or any other condition. As to the theory of acapnia, experimental evidence is presented supporting the probability that the primary derangement in shock is of nervous character.

In collapse, indirect and general considerations strongly indicate profound nervous derangement.

The conditions in shock and collapse differ fundamentally, and treatment indications differ accordingly.

In shock, associated with severe hemorrhage, restoration of blood volume is indicated. For this purpose transfusion seems best, but beneficial action may be obtained by intravenous injections of artificial solutions. The addition of a colloidal substance to such solutions causes their longer retention. For this purpose dilute acacia seems preferable to other substances hitherto employed.

Preventive measures and prompt treatment are strongly indicated.

Following this paper MELTZER (*ibid.*) contributes some observations so essentially sound that they are worthy of careful attention by every surgeon. The theory of acapnia assumes that shock is due to a diminution of carbon dioxide in the blood of patients in shock. This assumption suggests at the same time the treatment; it consists in having the patient breathe some carbon dioxide, or let him respire through a long tube, or, as it is called for short, rebreathing. The theory of acapnia as the cause of shock is about ten years old; it was brought forward by Dr. Yandell Henderson.

The reduction of carbon dioxide may merely be a consequence of shock and not the cause of it. In shock the activities of the body are greatly reduced, which necessarily leads to a diminished oxidation of the tissues of the body and, consequently, to a diminished production of carbon dioxide.

Macleod says that "the acapnia theory of shock was dignified some eight years ago by an apparently adequate burial," and he does not think that the new experiments of Henderson and Haggard are capable of resuscitating it. More important are the following facts: Henderson and Haggard themselves seem to think now that breathing of carbon dioxide may do some good in cases in which, in all probability, the patient would have recovered slowly without the treatment. Furthermore, Geoffrey Marshall, an expert anesthetist, is of the opinion that rebreathing is rather a dangerous procedure and surely ought not to be used in shock patients. Acapnia and rebreathing die hard, but as far as the science of physiology is concerned they are surely dying. It is regrettable to find that rebreathing has a strong hold on the minds of many surgeons and anesthetists in this country.

Low blood-pressure is a predominant symptom of shock. For at least six decades

physiologists firmly believed that low blood-pressure was accompanied by a relaxation of the peripheral small blood-vessels which lead to the accumulation of the greater part of the body's blood in the vessels of the abdominal viscera. In recent years the assumption gained the ascendency that in shock the peripheral blood-vessels are contracted.

Some time ago, in a paper presented before the Massachusetts Medical Society, Dr. Cannon of the Harvard Medical School explained the accumulation of the blood in the vessels of the abdominal viscera in shock by the assumption that the blood was trapped there between the constructed mesenteric capillaries and the capillaries within the liver, and he thought that an intraperitoneal injection of pituitrin would be an advisable method of treatment of shock. While in England Dr. Cannon met a number of surgeons who stated that they had never found the vessels of the abdominal viscera to be engorged in shock. He then dropped his previous conception of shock as well as his therapeutic advice. In England and France Dr. Cannon had occasion to study shock experimentally as well as clinically. He became converted to the theory that the most essential factor in the production of shock is acidosis, and began to advocate the treatment of shock by the administration of bicarbonate of soda.

He experimented together with Professor Bayliss, who previously recommended the intravenous injection of a 6-per-cent solution of gum acacia for the treatment of shock. Now both scientists recommended that this gum acacia should be given in a 4-per-cent solution of bicarbonate of soda. Recently, the theory of acidosis as the primary cause of shock lost ground. Bayliss himself gave up the idea that acidosis is of primary importance in shock, and he, as well as others, lost faith in the value of the alkaline treatment of shock. This is again a practical fact which may not be known to some.

As to the theory that shock is produced by pulmonary fat embolism, Dr. Porter himself admits that shock brought about by injuries to the abdomen may be due to "change in the hydrostatic conditions of the circulation" in the abdomen and not to fat embolism.

Porter's statements are more important to us when we come to discuss them from a clinical point of view. The casuistics are very meager; Porter refers to only five cases. There is no description of the details of their clinical manifestations. Low blood-pressure is the only sign which is mentioned as evidence of shock in these cases. But is this the way clinicians would make a diagnosis of pulmonary fat embolism? That grave condition presents a number of definite clinical symptoms outside of the presence of low blood-pressure. There are, in the first place, symptoms which point directly to the lungs as the seat of trouble. The patient is suffering from air-hunger, dyspnea; pulmonary edema and even hemoptysis are frequently present. On auscultation the presence of râles may be discovered. Then there are indications of the presence of fat in the circulation in abnormal quantities. The urine contains fat globuli. Fat may be readily detected in a drop of blood; moreover, even the sputum may reveal the presence of fat. There are then many clinical signs which point that the shock-like condition of the patient is due to pulmonary fat embolism. Dr. Porter does not mention in his articles that he availed himself of these signs.

The clinical distinction between shock and pulmonary fat embolism is important, especially from the therapeutic side of the question. Porter recommends the inhalation of carbon dioxide for the treatment of shock and claims that he has helped many such cases by this treatment. He administers carbon dioxide not for the purpose of meeting the possible exigencies of acapnia, but for the purpose of producing deep inspirations, which, according to him, would help to "drive the blood from the engorged abdominal veins into the chest, where it shall fill the half-empty heart and permit the faithful organ to fill the capillaries." Now

Wiggers is certainly right when he says that, if the circulation from the right ventricle is impeded by capillary emboli in the lungs, the introduction of larger quantities of blood in the right ventricle might lead to the dilatation of that ventricle and to death. According to Wiggers a shock is distinguishable from pulmonary fat embolism by the difference of the pressure in the right ventricle and the pulmonary artery; in pulmonary fat embolism the pressure is rather high, while in shock it is low. Therefore, while in shock it is advisable to drive, by any effective methods, the blood from the veins of the abdominal cavity into the right ventricle, this procedure has to be avoided in cases of pulmonary fat embolism. There are physiologic apparatus for establishing the pressure in the right ventricle and in the pulmonary artery; but they are too complicated to be of practical use at the bedside in the most of the clinical cases. There is, however, a very simple method, recommended by von Recklinghausen, which ought to be known and employed by every physician. One hand of the patient rests on the bed while the other hand is placed on the patient's thigh. When the pressure in the right heart is normal the veins of the hand resting on the bed are filled up, while those of the hand lying on the thigh are more or less empty on account of the fact that this hand is lying on about the same level with the heart; the contents of its veins, therefore, enter readily into the right ventricle. However, if the pressure in the right ventricle is above normal, the veins of the hand lying on the thigh cannot empty themselves with ease into the right ventricle. In this case the veins of both hands are filled up.

This is an appeal to physiologists, when they undertake to apply their scientifically trained minds to problems of practice of medicine, to adhere firmly to the careful critical methods which they are in the habit of employing in their physiologic researches, even if by doing so, as a consequence, the actual yield to medicine may be slow and, perhaps, even small. It is also an appeal to clinical men to imbibe well-established new physiologic facts, but in the application of these facts to stick closely to well-established, careful clinical methods.

THE TREATMENT OF ACUTE GONORRHEAL EPIDIDYMITIS BY NORMAL HORSE SERUM.

BROWN (*Glasgow Medical Journal*, November, 1918) quotes the conclusions as to the therapeutic value of antidiphtheric serum in the treatment of gonorrheal epididymitis as follows:

That antidiphtheric serum had been employed because, as an empirical expedient, it had been found effective in the treatment of other conditions which had no recognizable relationship with diphtheria infection.

That while strictly speaking the results could not be explained on the basis of the well-recognized immunity reactions which were specific in character, still there were phenomena in immunity reactions which were not inconsistent with the results obtained.

That the introduction of antidiphtheric serum as a heterologous protein may be supposed to stimulate the development of immunity by the organism to the infective agent.

That for this reason it might be suggested that normal horse serum might have an equally beneficial influence.

In order to constitute a basis for comparison with the previous results, an amount of horse serum equal to the amount of antidiphtheric serum previously employed was injected at corresponding intervals; that is to say, instead of injecting 5 Cc. of antidiphtheric serum, an injection of 5 Cc. of normal horse serum was given every twenty-four hours for five days. It was found that the employment of normal horse serum in this amount had no recognizable therapeutic influence.

The dose was then increased to 10 Cc., administered every twenty-four hours for five days, and here again the therapeutic results had practically no value.

It was not until the amount administered reached 40 to 50 Cc. daily for five days that good results were obtained.

The results which have emerged from the observation of 100 selected cases comparable with those observed in the first paper are that 200 to 250 Cc. of normal horse serum are required to produce the therapeutic effects obtained by 25 to 30 Cc. of antidiphtheric serum.

Taking the results as a whole, normal horse serum in the amounts indicated gave results as good as the antidiphtheric serum; and there was only one case in the 100 in which the amelioration of the symptoms was not progressive during the week through which the treatment was carried out. In this case an improvement occurred for the first three days, and on the fourth day there was a relapse. The treatment, however, was continued, and at the end of the week the symptoms had disappeared.

An important point which emerged in the comparison of the two series was that while antidiphtheric serum in the small amount produced an obvious constitutional reaction, indicated by fever and sweating, there was no such constitutional reaction following the use of the large amount of normal horse serum; at least in so far as the appearance of symptoms was concerned, although erythema appeared in some cases during treatment, and probably in many others after they were discharged south when the symptoms of epididymitis had gone.

There are certain facts connected with immunity to well-recognized infections that are suggestive in this context. There are certain infections which would appear by their incidence to change the whole constitution of the body—to alter the metabolic proclivity of the organism so as to render it immune to one type of infection and more susceptible to another. Thus, for example, an attack of measles almost invariably confers permanent immunity to a second attack, whereas it renders the body susceptible in many instances to pneumococcal and to tubercular infection. An attack of scarlet fever likewise confers prolonged immunity to a second infection of the same specific type, while it renders the organism for the time being extremely susceptible to streptococcal infection. Enteric fever, or pneumonia, on the other hand, does not induce prolonged immunity to a second attack, and one attack of erysipelas is said even to predispose to another. Smallpox confers immunity for a considerable period, and the cow-pox vaccine induces considerable immunity to smallpox. But perhaps the most suggestive observation in this relationship is the conclusion come to by Mattauschek and Pilz with regard to the immunizing influence of acute intercurrent infections in the course of syphilis. These authors were able to follow the progress of syphilitic disease in 4134 cases, and they found that 4.7 per cent of these developed general paralysis of the insane. Out of 157 cases in which the history showed the incidence of an acute febrile infection, pneumonia, erysipelas, etc., not a single case developed general paralysis.

Although these figures constitute too small a number on which to base a generalization, still they are significant, and suggest that the metabolic perversion induced by acute febrile infection in a syphilitic subject confers a certain immunity, to the brain, at any rate, in the progress of syphilitic disease, at least in that form which finds expression in general paralysis of the insane.

Although our observations leave untouched the problem why it is that there should be such a great difference in the relative amounts of the two sera required in the effective treatment of epididymitis, the general conclusion may be suggested that the injection of either serum produces a "serum disease," which in turn exercises an immunizing influence on the course of gonococcal infection. Whether this influence is peculiar to gonococcal invasion of the epididymis, in the same way as it is suggested that acute febrile infection has a protecting influence on the brain in syphilis, is a problem awaiting further observation. This could, of course, be settled in one of

its aspects by the selection of other gonococcal complications, such as rheumatism, for serum treatment.

CAUSES OF SHOCK.

CUMSTON (*New York Medical Journal*, Jan. 4, 1919) in his summing up of the research work which was done in the last eighteen months in the English and French armies does not throw large light on the subject, except to suggest that the hypotension of shock is the swing of the pendulum which in many cases indicates a sudden hypertension.

A. Binet and N. Vashide, studying the action of the various psychic processes on the blood-pressure, found that the latter increased from 1.5 to 2 centimeters Hg. under the influence of severe pain or mental calculation. The organic factors—hemorrhage and cold—are likewise excitants of the nervous system, and more especially of the vasoconstrictor nervous system. Cold excites the sensitive cutaneous nerves, and these transmit the impression to the vasoconstrictor centers, which react by causing a contraction of the vessels in the region exposed to cold. If the surface exposed is extensive, an elevation of the arterial pressure ensues, and this is followed by a normal reaction of cardiac hypertonia and polyuria. If, however, the pressure does not rise, a certain quantity of blood flows to the internal viscera and, therefore, the multiple causes of abdominal congestion at once become evident; on the other hand, there are excellent results obtained by heating the wounded, which reëstablishes the equilibrium in the distribution of the blood mass. Hemorrhage, like cold, excites by a process more difficult to determine, by automatic and reflex means, the functions of the vasoconstrictor centers. Therefore, among the factors of shock, many are excitants of the vasoconstrictors. They are not always hypertensors because a compensating action may come into play—cardiac slackening from inhibition, reflex dilatation of the abdominal vessels—but most usually they are. One is thus led to attribute an important part to vasoconstriction in shock, and the question arises to what extent facts verify this hypothesis.

From very numerous oscillometric tests made at the front by Delaunay during the war, he often noted that a strong emotion certainly produced a vasoconstriction and arterial hypertension. The Mn often went up from three to five centimeters Hg. and the Mx from five to six centimeters Hg. The vasoconstrictive action is of short duration, and when it persists it is soon followed by a sort of cardiovascular relaxation. In case of wounds the process is identical, but with the essential difference that the wound *per se* produces stronger and more durable causes of vasoconstriction. Delaunay was particularly struck by the high blood-pressure often met with in men immediately after the receipt of their wound, or a few hours after, when they had been despatched to the rear in automobiles. In reality these subjects supported this hypertensive paroxysm admirably, and as soon as they were told that their wounds were not serious, that they were far removed from the danger zone, and then comfortably put to bed, they complained less of cold and pain, the hypertension rapidly gave way to a mild hypotensive reaction, and a relaxation of the vasoconstrictor center occurred, followed by deep, quiet sleep.

The same reactions exist, but in an exaggerated form, in the seriously wounded who cannot be sent to the rear. Their greater pain and distress on the day following, when they suspect the seriousness of their wounds, the distress of danger from the time they enter an ambulance in the danger zone, and the great loss of blood they have sustained, all tend to increase the hyperfunctionating of the vasoconstrictor center. Hypertension generally exists, but it may be wanting if the compensating action comes into play.

It is in these conditions that hypotension and shock occur after a variable lapse of time. Now what takes place? Delaunay is quite inclined to believe that in some in-

stances there is sudden disturbance in the adaptation of the heart to the high arterial pressure created by the wound, but that usually the hypotensive reaction is easily explained by the action of Cyon's cardioabdominal depressive reflex, or later on by an exhaustion of the central vasotonicity—in other words, there exists a sort of post-hypertensive hypotension.

It may be argued that one often encounters patients with a hypertension with a very marked minima (twelve to fifteen, for example) and a high maxima (twenty to twenty-five) who support their hypertension perfectly well, and this is unquestionably true, but in these cases the organism has little by little and progressively adapted itself to the high blood-pressure, the heart is often hypertrophied, and at all events it has become slowly accustomed to perform its work in the new condition. The nervous system and the vasoconstrictive centers in particular remain indifferent to the process. It is a slow, organic hypertension, while in the case of the soldier wounded on the battle-field the hypertension is sudden and of the nervous type and due to vasoconstriction. The hypotensive reaction following the phase of sudden vasoconstrictive hypertension has as a near result, or immediate consequence, abdominal venous stasis, according to whether this is reflex (cardio-abdominal reflex) or mechanical (vasomotor atony). However this may be, as soon as the blood has become immobilized in the abdomen and has reached a certain amount the process is the same as in the case of hemorrhage, and the state of shock is produced by anemic autointoxication.

Besides this form of shock, whose *primum movens* is an excess of vasomotor excitation, there exist others whose primary cause is different, as far as the circulatory disturbances are concerned, be they inhibition or intoxication.

From what has been said, from the point of view of practice at the front, it is necessary wherever possible to fill out a card for all patients with serious wounds in a state of shock or liable to develop into this state, noting the general and psychic condition, that of the circulation—heart, pulse, blood-pressure—respiration, temperature, the importance of the hemorrhage, pain, etc. There is no doubt that surgeons will be greatly helped by these data.

Finally, from the view-point of general biology, from the foregoing remarks we may derive a particular conception of the state of shock. Its fundamental basis is, according to Pachon, a cardiovascular state of blood stasis. If there really existed in shock an inhibition of the chemical changes, or, if by adaptation, metabolism, and catabolism in particular, decreased in the same proportion as the circulation, the result would merely be a kind of hibernation with a lowering of the temperature, but with a rapid, fatal issue. Now, we know that this is not so. The chemical changes preserve their intensity while the circulation is reduced, anemic autointoxication occurs, the chemical composition of the tissues and blood is changed, and all the organic functions are involved. It would seem, therefore, that, with Delaunay, we may for the time being at least define the state of shock as a state of autointoxication resulting from discord between the chemical and circulatory functions.

SURGICAL TREATMENT IN EXOPHTHALMIC GOITRE.

BRAM (*New York Medical Journal*, Jan. 4, 1919) concludes a brief general discussion on this subject as follows:

Surgical indications in Graves's disease are: (*a*) Marked pressure symptoms where dysphagia and dyspnea are distressing; dangerous pressure symptoms in exophthalmic goitre are rare and usually respond promptly to carefully administered non-surgical measures. (*b*) Malignant changes in the thyroid gland. (*c*) Instances where a subject of non-toxic goitre suddenly finds herself afflicted with the Basedowian syndrome. If it is concluded that the change is not due to the thyroid gland itself, but to the pressure of the tumor upon the cervical sympa-

thetic, the removal of the latter or an operation upon the goitre to relieve the pressure may cure the patient. In this case, though the patient is suffering from what appears to be exophthalmic goitre, the case is not one of genuine Graves's disease, since there is no surcharging of the blood with thyroid substance.

All routes of research seem to lead to the conclusion that the modus operandi of the clinical picture of Graves's disease indicates a disturbance of many or all of the glandular tissues of the body; in such a status, operation upon the thyroid gland as a curative measure seems futile.

Some cases end in spontaneous recovery; it is such cases as these, where operation is performed, which are claimed as surgical successes.

The immediate and remote deleterious consequences of surgical interference—*e.g.*, the accidental removal of the parathyroids resulting in tetany; the possibility of postoperative myxedema; injury to the recurrent laryngeal nerve directly through the operation or subsequently by pressure of scar tissue to paralysis of the vocal cords—all these "must give us pause."

Operation is further capable of harm by the devitalization of the patient through anesthesia and shock and the various other dangers because of the existence of glycosuria in many cases.

Surgical procedures dangerously postpone the utilization of successful non-surgical procedures.

Proper non-surgical measures, persisted in with patience and enthusiasm, will cure every early and moderately advanced case and more than seventy-five per cent of advanced cases of Graves's disease.

All good surgeons seem to admit by word and pen that their success depends upon the careful non-surgical postoperative treatment which they employ as the basis for permanent cure.

As the art and science of healing become less homogeneous and more heterogeneous in character, and concomitant with this change we find a comparative reduction in the number of general practitioners and an increase in the number of specialists; and since the large number of men engaged in scientific research have added so much to our knowledge of the rôle of ductless glands in medicine, it seems fitting that men adopt the thyroid as their field of study and practice. In so doing the thyroid specialist will not only find a broad and fascinating field of study, but he will also render humanity an inestimable service in helping to eradicate this disease, which is becoming more and more a prominent factor with the increasing strenuosity of modern life.

REPORT ON SIX HUNDRED AND THIRTY-EIGHT HERNIOTOMIES PERFORMED DURING MAY, JUNE AND JULY OF 1918.

DODGE (*Journal of the Michigan State Medical Society*, January, 1919) reports on 630 herniotomies, of which only 7 were femoral. The vast majority were performed according to the Bassini method. The preparation was the usual one. Patients were permitted to sit up in two weeks. In three or four weeks they were discharged from the infirmary to the Development Battalions with the understanding that they should not be returned to full duty until two months after the operation. There were nine cases of superficial infection. One case of recurrence coming to the attention of the service was not infected.

It appears then that in an average period of four and a half months there have been 2 per cent recurrence in one hundred and seventy-eight cases. This, however, includes all the known recurrences in three hundred and ninety-two cases, the remainder having been transferred to other camps, free from recurrence. In course of time recurrence will take place in other cases no doubt, but it is not likely to exceed 2 per cent of all cases operated. This result compares very favorably with the results obtained by individual operators in large series of cases. No death occurred in the series.

In conclusion the writer expresses the opinion that the most important thing to consider in performing a herniotomy for inguinal hernia is the treatment of the sac. If the sac is thoroughly separated from the tissues of the cord and ligated at the reflection of the peritoneum the hernia is not likely to recur whether in subsequent proceedings the cord is transplanted or not. Many of the author's cases were of the incomplete type, and it was necessary in such cases to raise the cord in order to locate the sac, which invariably comes out of the abdomen underneath the cord. Many of the operators transplanted the cord in all cases of this kind, and did not transplant if they found it unnecessary to raise the cord from its place in the canal. Exposure of the shelving edge of Poupart's ligament, freeing it from fascia, and securely sewing it to the conjoined tendon, whether underneath or over the cord, is considered vital to the permanent cure of the hernia.

HERPES PROGENITALIS.

ARONSTAM (*Medical Review of Reviews*, January, 1919) states that in dermatologic practice we are able to discern two chief varieties of herpes progenitalis, viz.: That due to a peripheral neuritis with preceding or accompanying subjective symptoms, as dermatalgia and pruritus; that due to a vasomotor paralysis with less marked subjectivity and characterized by dilatation of the capillaries supplying a particular region of the urogenital tract.

These two main forms may be brought about by any of the following causes:

Neurosis of a hereditary type.

Debilitating diseases, especially the infections and exanthemata, may leave in their wake a depraved condition of the economy favoring the frequent occurrence of herpes progenitalis; to this category also belong the divers pathologic states of the blood, as anemia, chlorosis, hydremia, leucocythemia, uremia, etc.

Autotoxemia, due to gastrointestinal derangements and the ingestion of unwholesome, indigestible, and obnoxious articles of food.

Drug intoxications, notably those of the salts of metals, as mercury, silver, lead, zinc, and various compounds of iodine; the continuous use of some of the active alkaloids and the habitual imbibition of malt liquors and alcoholic beverages.

Senile degeneration, predilectively invading the peripheral nerve filaments of the cutaneous surface, is a very potent cause in the production of herpes.

Neuroses and psychoses acquired postnatally and during adolescence; neuropathologic states of the central and sympathetic nervous systems and the peripheral nerve structures.

The different dyscrasiæ and diseases of metabolism, tuberculosis, malaria, the uric acid and rheumatic diatheses, diabetes, scurvy, and not infrequently leprosy. (Cases are on record of the repeated occurrence of herpes progenitalis in lepers.)

Among the local conditions may be enumerated the following: an elongated and constricted prepuce, the bacillus smegma, irritating discharges from the genital tract, especially gonorrheal secretion, and that caused by vegetations; coitus immediately following menstruation and vaginal discharges of the staphylococcus group are other etiological factors of moment.

Overexertion of the glans penis and prepuce through excess in venery or masturbation; on the other hand, ungratified sexual desire may produce the same results.

A peculiar dartrous diathesis or predisposition on the part of the individual to the affection under discussion, with or without participation of any of the above etiologic factors, as evidenced by recurrent outbreaks of herpes progenitalis.

Reflexly: oxyuris vermicularis and ascaris lumbricoides, affections of the prostate, sexual neurasthenia, spermatorrhea, prostatorrhea, etc. It may be noted that children are by no means exempt from progenital herpes, judging from quite a number of cases observed in children's homes.

And last, but not least, a special bacillus

has been attributed with the pathogenesis of the eruption.

But little need be said of the symptomatology of this affection, for in no disease do we find so well-marked characteristics as in urogenital herpes. A few points must, however, be borne in mind upon making a conclusive diagnosis, viz.: the grouping and concentricity of the lesions; the subjective symptoms, which almost always precede or accompany them, at least in 75 per cent of all cases.

The most significant and important features in the diagnosis may be formulated as follows:

The multiplicity and the grouping of the lesions—*i.e.*, we commonly encounter a number of vesicles arranged in a circular or semicircular manner, usually situated upon the distribution of the peripheral nerve filaments. More than one group can in the majority of cases be detected.

The presence at some time during the course of this dermatosis of pruritus and pain.

The indefinite period of incubation, which differentiates it from the simple multiple chancroid, which period never exceeds ten days.

The absence of induration or cartilaginous thickening at the margin or border of the individual group or circle, thus eliminating the probability of an initial lesion.

The lesions are destitute of any moisture, unless the vesicles have been irritated or have ruptured spontaneously or accidentally, when it assumes a serous or, if infected, a purulent character.

The lesions become covered with crusts soon after the absorption of the serum in the vesicles, a state of affairs seldom, if ever, exhibited by the chancroid.

Resolution of the vesicles is accomplished within six to ten days after their appearance, leaving behind pinkish areas, which soon fade, however; the skin or mucous membrane returning to its normal color, devoid of any stigma to mark the former site of the original lesion.

These few diagnostic points should amply suffice, the writer has reason to believe, to establish the correct diagnosis and serve to eliminate the possible existence of other lesions, with which herpes progenitalis may be confounded. It is obvious that a tabulation of the differential points relative to the chancroid, erosive balanitis, the initial sclerosis, and preputial vegetations would be unnecessary and superfluous, provided the above features of the affection be kept in mind.

To whatever local condition we may ascribe the existence of progenital herpes, and in whatever manner this dermatosis be brought about constitutionally, the indications for treatment may be summed up as follows:

Remove the cause and treat any systemic disorder acting as an exciting or predisposing factor.

Observe strict cleanliness of the parts involved.

Use protectives to exclude any irritation or infection of the lesions.

If the latter has occurred in spite of our efforts at prevention, treat the resulting ulcer antiseptically with the various agents at our command.

The first of these measures has received ample consideration in a preceding page. The second can be easily secured by daily ablutions of warm water, to which a small amount of boric acid or sodium biborate has been added, after which the area may be dried with a pledget of absorbent cotton, and one of the following protective powders or solutions applied:

Bismuthi subnitr.,
Acidi boracici, āā 12.0;
Aristolis, 8.0.
M. et fiat pulv.

Or,

Europhen,
Pv. zinc. oxidi, āā 8.0;
Bismuthi subnitr.,
Pulv. amyli, āā 12.0.
M. et fiat pulv.

Prior to the above formulæ, it is advisable to moisten the regions with a little glycerin, in order that the powder should properly

adhere to them. Chemically pure talcum or the palmitate and stearate of calcium and magnesium, to which five per cent of ichthyol or balsam Peru has been added, will admirably serve the purpose.

In cases in which the lesions are situated upon the gland or prepuce, they should be protected from friction, pressure, or irritating secretions by separating these two structures by means of a piece of sterile gauze, containing a slit in the center, through which the glans penis is passed and the prepuce drawn over it. When the vesicles are located in the space between the scrotum and thigh, they should be covered by borated gauze and a loose bandage applied.

Should this for obvious reasons be inexpedient, or impossible, then the areas may be protected by painting them with flexible collodion containing any of the above enumerated combinations in solution or suspension. After evaporation of the ether, a pellicle is left behind which sufficiently protects the parts, besides enabling the incorporated remedial agents to exercise their medicinal effects.

Where the lesions have ruptured either through friction or spontaneously, and have become infected, we must endeavor to keep them scrupulously clean and free from all accumulating discharges, by washing them with some mild antiseptic solution, as boric acid, lysol, etc.; following this any of the above mentioned preparations may be applied. At no time should we attempt to cauterize these ulcers or use any strong antiseptic or irritant, unless they be contaminated by concomitant chancroidal pus, and even then with a great deal of care and circumspection.

Strong applications should be avoided, lest the patches assume an angry and eczematous character, and the result be worse than the original lesion.

When thus treated, the vesicles soon desiccate and become covered with an insignificant crust, beneath which epithelial regeneration takes place. The crust ultimately falls off, exposing a pink area, which soon fades to the color of the normal skin. The entire cycle is completed in ten days.

At this juncture it may be remarked that the meatal mucosa is not exempt from outbreak of herpes, as evidenced by a number of cases under the author's observation. There were also concomitant groups of vesicles elsewhere on the dorsum of the penis and prepuce, so there was no doubt as to correctness of the diagnosis.

THE TWO MOST IMPORTANT SIGNS IN CHRONIC APPENDICITIS.

Morris (*Medical Record*, Jan. 11, 1919) states that of the four common forms of appendicitis two are infective lesions and two are irritative lesions. Among the irritative lesions, what we may call syncongestive appendicitis is the least important. There is a congestion of the appendix synchronously with congestion of other structures in the vicinity as a result commonly of some interference with the blood or lymph circulation. The appendix feature comes into evidence because the inner coats of the appendix trying to swell within the tense outer sheath become more or less pinched and painful. This is a very harmless form of the trouble and disappears when the congestion of neighboring structures has been relieved. The commonest of all forms of appendicitis is an irritative lesion, not an infective one, and it appears in fibroid degeneration of the organ. The appendix is prone to undergo fibroid degeneration in most of us late in life, but in the neurotic neurasthenic group of patients early fibroid degeneration of this vestigial structure seems to appear very early as a stigma of arrested development, associated with other stigmata which the neurologist commonly discovers. Fibroid degeneration of the appendix probably takes the patient to the doctor's office more frequently than any other form of appendix trouble, and this irritating lesion with its accompanying gastroenteric features will often lead pretty good diagnosticians into mistaken diagnoses. Another irritative lesion of the appendix, not infective, is one in which the appendix

has become involved to greater or less degree in scar tissue following some previous acute infective invasion. In this sort of a case nerve elements remain in scar tissue very much as they do in an appendix undergoing fibroid degeneration. It is because of the persistence of nerve elements that we commonly have chronic appendicitis, not infective in character, giving rise to disturbance which sends the patient to the doctor's office. The matter of differential diagnosis becomes important.

There are two chief signs upon which we may place dependence when looking for the culpable organ. These two points in diagnosis do not relate to acute appendicitis. When a chronic irritative appendicitis has registered its nerve impulses on certain sympathetic ganglia for a fairly long time the muscular coat of the ascending colon becomes wearied. This wearied ascending colon with lax muscular coat remains distended with gas most of the time and gives us what Morris calls the "cider barrel sign." Percussion upon the left side of the patient's abdomen gives us a note reminding one of the cider barrel in October, and percussion upon the right side of the patient's abdomen gives us a note suggestive of the cider barrel in March.

The other chief sign, and the most important one perhaps, consists in a hypersensitiveness at the site of the fused second and third sympathetic lumbar ganglia. The older anatomists spoke of the sympathetic lumbar ganglion, including several ganglionic structures, but the later anatomists commonly make five lumbar ganglia on either side of the spinal column in the lumbar region. Persistent nerve impulse from an irritated appendix appears to be registered selectively upon the fused second and third ganglia, so that we have hyperalgia of more or less permanent character relating to this ganglionic point. If we press deeply upon the abdomen about an inch and a half to the right of the navel and a trifle caudad, the patient speaks up when we are pressing upon this particular ganglionic point in cases of chronic appendicitis, but he does not interest himself in this point particularly if we do not have chronic appendicitis. When Morris first made presentation of this point at the Academy of Medicine, Dr. Robert F. Weir brought with him for the discussion a number of anatomical plates and argued that there might be some error in the observation because there was no direct nerve connection between the appendix and these lumbar ganglia. He then assumed that we might be dealing with the question of sensory motor synapsis by way of the spinal cord, but Dr. Albert C. Geyser has made more elaborate explanation. It is his belief that the irritated appendix calls for a determination of blood to the vicinity and that regulation of the blood supply being dependent upon the sympathetic nervous system the sympathetic ganglia called upon most persistently became hyperesthetic. In any event when an afferent impulse is sent from an irritated appendix to a segment of the spinal cord an afferent impulse with two definite manifestations is manifested. One of these consists in sensitiveness of the skin in the head zone for the appendix, and the other and more important sign consists in hypersensitiveness at the sympathetic lumbar ganglionic point situated about one inch and a half to the right of the navel and a trifle caudad from that point.

In cases in which hypersensitiveness of the left lumbar ganglion is discovered on pressure we discount the importance of the sign relating to the appendix and look for some irritative lesion in the pelvis. The pelvic sympathetics gather and transmit impulses over such a wide distribution that both sets of lumbar ganglia may become hyperalgic, but when the appendix alone is involved the right lumbar ganglionic sign standing alone becomes the most important one in differential diagnosis. If the first lumbar ganglion is involved, the one to the right of and somewhat cephalad from the navel, we have Mayo-Robson's point relating to the pyloric and gall-bladder region.

TONSILLECTOMY VERSUS HELIO-ELECTRIC METHODS.

STEWART (*New York Medical Journal*, Jan. 4, 1919) believes that inflamed and discharging tonsils should receive some preliminary treatment by the diathermic method before they are removed. He further favors fulguration. He advises in some cases the Kromayer lamp, and quotes McCaskey to the effect that after reducing an enlarged tonsil by ultraviolet ray there may be a return of tonsillar trouble unless the patient's nitrogen metabolism has been placed under a proper equilibrium. At the Johns Hopkins Hospital both tonsils and adenoids are considered as physiologically important structures, which besides their unknown purposes protect the lungs from dust and disease germs.

Tonsillar and nasopharyngeal diseases have caused infections and rheumatoid arthritis, lumbago, acute rheumatic fever, enlargement of cervical glands, and kidney inflammation. The course of infection from the tonsils to other parts of the body is thus established beyond question, and the indications for the treatment of tonsils and adenoids is clear and rational, but tonsillectomy is not the only method of treatment. It is therefore of great importance to study the report of the 1000 operations of tonsillar and nasopharyngeal infections as a cause of systemic disease, as reported by the Johns Hopkins Hospital. These cases were seen and carefully studied during the last five years. There was no haphazard and hurried examination, the operations were performed under the strict rules of modern surgery, skilled anesthetists and trained assistants were a part of the rigorous operative routine, and the cases were followed up to secure the facts with respect to the diseases supposed to be due to the tonsillar and adenoid infection.

The result of the experience gained in the foregoing study given to these 1000 cases of tonsillar and adenoid infections may be summed up as follows:

Tonsils and adenoids should not be operated upon during the acute stage of a tonsillar inflammation, as a brain abscess may result.

Diabetes is just as much a contraindication for tonsillectomy and adenectomy as it may be for any operation under general anesthesia.

Tonsillectomy is rarely of benefit and may do harm in the deforming type of arthritis.

Nothing is to be gained from a tonsillectomy during the acute stage of chorea, acute rheumatic fever, or endocarditis.

The Johns Hopkins surgeons state that, in their experience, the very diseases for which tonsil and adenoid operations are performed may and do recur after the nose and throat have been put into a normal condition.

In any event the tonsils are not the only gateway for disease germs to gain entrance into the system.

Tonsil operations are justified only as a means of possibly preventing further heart infections as a result of later attacks of acute tonsillitis.

The frequency of heart and joint affections in chorea may justify the preventive measure obtained by tonsil treatment.

Tonsil treatment is indicated in the infections, joint affections, and in muscular pains of myalgia.

In the early stages of kidney inflammation, tonsil treatment is indicated.

The tonsils are the main cause of enlarged lymphatic glands near the angle of the jaw, as these large glands in the neck rarely subside after treatment of diseased teeth.

Tonsil treatment alone will not cure tuberculous glands, rheumatic joint disease, nor kidney inflammation.

Makuen in an address to the Clinical Congress of Surgeons says: "The capsule of the tonsil is even more essential to the normal structural relations of the pharynx than the tonsil itself, and its removal is to be deprecated from the standpoint of one who has any regard for the phonatory and articulatory function of the adjacent muscles." The complete removal of the

capsule of the tonsil robs the interpharyngeal musculoaponeurotic sheath of its main support. This is the reason for a collapse of the pillars of the fauces. The removal of this supporting structure likewise increasing the wound area and causing an anatomical change in the faucial relations, is the deplorable result.

Of interest in this connection, the following data have been obtained by the author, in correspondence with 1000 physicians in Ohio, Indiana, and Kentucky:

Total number of tonsil operations, 10,756; deaths, 15; deaths in five out of seventy-one large cities written to, 18; primary hemorrhage, 432; secondary, 79; ligations for hemorrhage at time of operation, 488; hemophiliacs, 26; prolonged coagulation, 54; voices lost, 4; voice tones gained, 2; septic cases before operation, 252; septic cases after operation, 9; fatalities from ether, 2; fatalities from bromoform, 1; fatalities from oxygen and ether, 12; cases needing stimulants after operation, 55; diphtheria after operation, 8; bronchiectases after operation, 3; pulmonary abscess after operation, 1; hyperpyrexia after operation, 14; emphysema of face after operation, 1; skin rashes after operation, 8; dryness of throat, many replies stated frequent, 39; adhesions of pillars, many replies stated frequent, 21; ear infection, many replies stated frequent, 35; shock, many replies stated frequent, 19.

These statistics are brought to notice to direct attention to the facts:

That tonsillectomy does not insure against future attacks of sore throat, nor of other diseases and infections for which the operation is done.

That tonsillar tissue is present in nearly one-half the cases after operation, and not always to the detriment of the patient nor a reflection on the operator.

That helioelectric, fulguration, and diathermic methods do not accomplish more than the cutting operations, their value being in the equally good results to be obtained in selected cases in comparison with the cutting methods; less the risk to the voice and of death from anesthesia, or uncontrolled hemorrhage; and without the shock to the patient from undue hemorrhage when the latter is controlled.

That badly diseased tonsils should be enucleated whether large or small unless some unusual factor contraindicates the use of general or local anesthesia, in which case secure the best results possible by helioelectric methods.

TREATMENT OF PEPTIC ULCER BY GASTROENTEROSTOMY.

C. H. Mayo (*Minnesota Medicine*, January, 1919) holds that gastric and duodenal ulcers are probably the result of local thrombi from an infection by a certain group of streptococci which grow in an acid field. Such ulcers are found four times as often in men as in women of every walk of life, in every country, and under every condition except that of non-acid stomach. They are not caused in man by traumatism of the mucosa through bones or foreign bodies such as fowls naturally take as aids to digestion. About 80 per cent of gastric and duodenal ulcers appear in the first portion of the duodenum in which each bolus of acid chyme remains until neutralized. Occasionally the bacteria are undoubtedly carried in the blood stream from a local focus, and at times bacteria enter the chyle duct from the intestine but do not attack the mucous membrane except as infarcts in its capillary circulation, in the rear, so to speak, and the area involved is at once attacked by the pepsin in an acid medium. Rosenow, in his research work, produced gastric ulcers in a very large percentage of instances by injecting into the blood stream of animals bacteria derived from gastric ulcers.

The patient who is suffering from gastric ulcer describes attacks of stomach trouble of a few weeks' duration, which alternate with periods of a few to many months of good health; the attacks, however, become more frequent or continuous as the condition becomes chronic. The patient speaks

of pain, of burning on an empty stomach three to four hours after eating, of sour, burning eructations in the night; of food ease, and later soda ease, because of the dilution or neutralization of the acid. The passage of food over the ulcer is always a relief. The acid and pepsin covered ulcer in the food-empty stomach or duodenum is the cause of pain, as the stomach when empty of food often contains a quantity of gastric secretion induced by pyloric spasm. It is evident that duodenal alkalies do not respond to gastric acids as do the pancreas and liver.

Occult blood is of but little aid in making the diagnosis of gastric ulcer. True hemorrhage occurs in 25 per cent of cases. Close questioning of the patient concerning the appearance of bloody or dark stools may give a much higher percentage than this. The *x*-ray gives very conclusive evidence in about 95 per cent of cases; failures in diagnosis are usually due to reflexes from the gall-bladder or appendix to the stomach.

Sippy has done much to establish a basis of medical treatment of ulcer. He has shown that pepsin must have free acid above five points (the higher the better) in which to work. His principle of treatment in an attack is, therefore, to reduce the acid content by dilution of food or by neutralization with alkalies every hour during the greater part of the day. Milk and fats dilute the acid and delay digestion, with a gradual reduction of acidity.

It is just as much a fallacy to say that a peptic ulcer is always cured or healed after an attack is over, as to consider an ulcer of the leg healed after painful extensions have become quiescent. The higher the free acid the more active the pepsin; combined acids (as in cancer) activate pepsin but slowly; the pain in the latter cases is therefore due to peristalsis. Whatever the degree of acidity, neutralization must occur in the area of Brunner's glands in the upper portion of the duodenum. The circular muscle of the duodenum about the region of the common bile duct holds each acid bolus in the first two and one-half inches of the duodenum until the mass, regardless of the number of ineffectual peristaltic waves in the pyloric portion of the stomach, is neutralized by duodenal secretion to prepare for the alkaline digestion. When the mass is neutralized and alkali touches the pyloric ring, the next bolus will be delivered to pass through the same process. The neutralized chyme passes on to be acted upon by the pancreatic juices and the bile fluids, the latter aiding in emulsifying fats. Only within this neutralizing field of the duodenum can an ulcer occur. The duodenal secretion is stimulated less by gastric juice than by food. Eating stimulates the essential digestive preparation, which is alkaline; the acid is convenient and essential for the preparation of certain foods but is not essential to life. The acid activates the secretin in the mucous membrane of the upper intestine, although secretin appears as an activating agent without acid, and thus stimulates the pancreas to secretion. We often see patients who complain but little while under observation, yet who show a non-acid stomach for months and years. Some few persons supposed to possess non-acid stomachs have a thirty-minute period of acidity within the hour after eating. Those with non-acid stomachs have a relaxed pyloric sphincter, which may be seen when of necessity the bile is delivered by operation into the stomach. Persons with hyperchlorhydria do not have spells of trouble; but their trouble is continuous and is caused by a spasm of the pyloric sphincter with a retention of many cubic centimeters of acid and gastric juice, and occurs on a food-empty stomach. They are relieved by taking soda or food; even a few peanuts or kernels of popcorn is a mucous stimulant and develops the duodenal secretion, without which the alkali will not bring about the relaxation of the pyloric muscle and the relief sought. A lack of balance between the gastric acids and the duodenal alkalies of digestion is probably the cause of gastric ulcers, as a

biochemic factor allergic to a group of acid-growing streptococci.

Paterson has shown that the acids in the stomach are lowered about thirty points after gastroenterostomy. After the stomach has been emptied of food, the duodenal secretion ceases, and the pyloric spasm ensues, some bile and the alkaline intestinal secretion are then found mixed with and diluting the acid secretion remaining in the stomach. After gastroenterostomy for duodenal ulcer, the greater part of the food will pass through the new opening for some weeks; later, after healing is complete through the natural peristaltic efforts of the stomach, the new outlet divides its work with the pylorus. Healing follows upon the lowering of the acid mediums and a chemical change occurs in the natural environment of the bacteria which enables natural immunity agents to deal with them and their results. The patient makes use of his own drug store for neutralization, so to speak, and the effects of the spasm of the pylorus are overcome by the new opening. An ideal gastroenterostomy would make possible a trap-door which would close when food was taken and open after all food has left the stomach and duodenal secretion had ceased. This would permit gastric secretions to pass through as well as to be diluted through its opening; thus the effects of spasm of the pylorus would be overcome until food is again taken and duodenal secretion again occurs.

DUODENECTOMY.

GREY (*Surgery, Gynecology and Obstetrics,* January, 1919) concludes a laboratory study of this subject as follows:

From the results of the experiments outlined, certain definite conclusions may be drawn. In the first place they demonstrate that, so far as the surgical technique is concerned, the major pancreatic duct can be transplanted successfully into the jejunum. Many months subsequently to this operation nothing abnormal is made out in the microscopical or the gross architecture of the pancreas except a dilatation of the duct, most apparent in the third proximal to the intestine. The ostium at the lumen of the bowel remains patent.

It is evident, in the second place, that both the biliary and the pancreatic secretions may be successfully diverted from the duodenum into the upper jejunum. The withdrawal of these alkaline juices from the duodenum must profoundly affect the chemistry of duodenal digestion, since peptic ulcers not infrequently develop here under such conditions. The subsequent resection of the duodenum and the suture of the jejunum (which now receives the pancreatic juice) to the stomach eliminates complication. Upon the reëstablisment of channels of communication between the liver and pancreas, and the gastrointestinal tract, of course, depends the character of the nutrition of the animal, since serious disturbances in intestinal digestion arise in the absence of the secretions from these glands.

The third point concerns the blood-vessels of the pancreas. It is apparent from the protocol of the duodenectomized animal that it is possible to resect the duodenum—every trace of mucosa and approximately all of the muscular coats—without embarrassing the vascular supply of the adjacent pancreas. This accomplishment does away with the necessity of excising the greater portion of the gland, a recourse to which Minkowski was forced to turn when he sacrificed the pancreaticoduodenal vessels with the duodenum.

A fourth conclusion may be advanced, concerning the plan of the various operative steps. The results of the experimental work outlined above have demonstrated that success can only be looked for in excising the duodenum and carrying out the reconstructive steps when the operation is divided into a number of stages, leaving an interval of several weeks at least between the successive steps of the procedure.

Finally, regarding the importance of the duodenum to the life of an animal the following conclusions may be drawn: Min-

kowski's experiments sufficed to establish the fact that the resection of the duodenum, *per se*, has nothing to do with the development of diabetes. The experiments reported at this time afford indisputable evidence that the presence of the duodenum is not essential to the life and comparative good health of a dog, at least for 9½ months, provided that the pancreas and the liver continue actively to discharge their respective secretions into the gastrointestinal tract. Since the animal reported here succumbed in the end to a complication which has nothing to do with the operative measures suggested, or with the loss of the duodenum, it seems fair to assume that with a large series of animals, working under favorable conditions, a few would live for a much longer period of time. From these considerations, then, it is evident that the conclusions of Stassoff regarding the inability of the remaining gastrointestinal tract to compensate for the loss of the duodenum are not substantiated by experiment.

TREATMENT OF PURULENT ARTHRITIS BY SIMPLE ARTHROTOMY FOLLOWED BY IMMEDIATE ACTIVE MOBILIZATION.

Willems (*Bulletin et mém. Soc. de chir. de Paris,* 1918, xliv, 1098) amplifies his previous reports regarding the utility of arthrotomy followed by immediate active mobilization of the limb, and gives his results. The reason why arthrotomy failed when used alone was because it did not drain a purulent arthritis, while resection did. But Willems considered resection too radical a procedure for the purpose of drainage alone. There was little choice, however, for if resection were not done, the chances were that an amputation might be necessary.

Immediate active mobilization, however, assured drainage. With movement of the joint, such as the knee, it could be seen that pus was readily expelled between the synovial surfaces, and the more extensive and complete the movements, the greater was the amount of pus expressed.

A vertical linear arthrotomy, usually bilateral, suffices for the knee-joint. The general rules applicable for the knee apply to the other joints also, except that their form requires some variation.

A purulent arthritis treated by arthrotomy and active mobilization evolves like an ordinary abscess. Owing to the excellent drainage, infection is confined to the synovial. It is also owing to the drainage that periarticular abscesses, which are so frequent in purulent arthritis treated by the classic methods, are unknown with active mobilization.

Temperature is kept within low limits. The muscles of the limb are entirely or almost entirely preserved in their normal state. There is consequently a definite preservation of movements. Willems says that when the method is well applied, ankylosis can always be avoided. In the great majority of cases movements are quite normal and the limb shows no functional traces of the infection.

In purulent arthritis movements are possible just the same as in non-infected articular lesions. Pain is felt only when the drainage is insufficient; it ceases when the joint is emptied of pus.

Willems has treated 20 cases of purulent arthritis among war wounds by this method —11 of the knee, 4 of the elbow, and 5 of the tibiotarsal joint. Altogether he has obtained 13 perfect recoveries with preservation of movements, 2 recoveries with incomplete movements, 4 with ankylosis; and in 1 case resection was necessary. The 11 knee cases gave 7 perfect recoveries, 3 ankyloses, and 1 resection; the elbow cases gave 3 perfect recoveries and 1 ankylosis.

None of the imperfect results can in any way be imputed to the method adopted. Of the 13 perfect recoveries, there were only five cases in which there were no bone lesions. All the others had intra-articular fractures accompanying the purulent arthritis.—*Surgery, Gynecology and Obstetrics,* January, 1919.